



*Files are in Adobe format.  
Download the newest version from Adobe.*

## **2011 COMBAT VEHICLES CONFERENCE**

*“Investment Strategy For The Future of Heavy Forces”*

**Dearborn, MI**

**24 – 26 October 2011**

### **Agenda**

**Tuesday, October 25, 2011**

#### **GENERAL SESSION - SESSION I**

##### **PEO'S PERSPECTIVE**

- Mr. Scott Davis, Program Executive Officer Ground Combat Systems, U.S. Army

##### **ACQUISITION KEYNOTE ADDRESS**

- MG John Bartley, USA, Program Executive Officer, Integration, U.S. Army

##### **COMBAT VEHICLES RESEARCH AND DEVELOPMENT**

- Dr. David Gorsich, Chief Scientist, U.S. Army RDECOM-TARDEC

#### **GENERAL SESSION - SESSION II**

##### **MARINE CORPS KEYNOTE ADDRESS**

- BrigGen Daniel O'Donohue, USMC, Director, Combat Development Directorate, U.S. Marine Corps

##### **PANEL DISCUSSION MARINE CORPS PANEL**

###### **Panelists**

- LtCol (Sel) Ethan Smith, USMC, PM Tank Systems, MARCORSYSCOM
- Maj Zarnecki, USMC, PM Advanced Amphibious Assault, Marine Corps PEO Land Systems
- Maj Henry Kayser, USMC, Operations

##### **PANEL DISCUSSION WAR FIGHTER PANEL**

###### **Panelists:**

- Maj Daniel Hughes, USMC, Instructor, Armor School, U.S. Army's Maneuver Center of Excellence Ft. Benning, GA; Former Tank Company Commander in Afghanistan
- LTC Jay Gallivan, USA, USA Brigade Training Team, NTC
- CPT James Ianitelli, USA, Assistant Product Manager, JERRV/Systems Integration, TACOM
- SGM Brandon Jenks, USA, Sergeant Major for the TRADOC Capability Manager, Stryker Brigade Combat Teams, Fort Benning, GA

**Wednesday, October 26, 2011**

##### **BREAKOUT SESSIONS WITH PM'S**

- COL William Sheehy, USA, Project Manager, Heavy Brigade Combat Team
- Mr. Davis Dopp, Project Manager, Stryker Brigade Combat Team

# 2011 COMBAT VEHICLES CONFERENCE

## *INVESTMENT STRATEGY FOR THE FUTURE OF HEAVY FORCES*

### HIGHLIGHTS TO INCLUDE:

- ▶ PEO & PM  
Ground  
Combat Systems
- ▶ Acquisition  
Keynote  
Address
- ▶ R&D/Future  
Programs
- ▶ War Fighter Panel



OCTOBER 24-26, 2011  
[WWW.NDIA.ORG/MEETINGS/2620](http://WWW.NDIA.ORG/MEETINGS/2620)

HYATT REGENCY DEARBORN ▶ DEARBORN, MICHIGAN

EVENT #2620

## LODGING INFORMATION

A block of rooms has been reserved at the Hyatt Regency Dearborn. To make your reservation, please use the links below to reserve your room online or call the hotel directly. In order to ensure the discounted NDIA rate, either use the links below or call the hotel; when calling you must ask for the *NDIA Combat Vehicles Room Block*. Rooms will not be held after **October 3, 2011** and may sell out before then. Rates are not guaranteed after this date.

Hyatt Regency Dearborn  
600 Town Center Dr.  
Dearborn, MI 48126-2793  
Tel: (313) 593-1234  
Fax: (313) 593-3366

Government Rate: \$95\*  
<https://resweb.passkey.com/go/combatgovernment>

Industry Rate: \$149  
<https://resweb.passkey.com/go/combatattendees>

\*Or prevailing Government per diem. The government per diem rate is available only to active duty or civilian government employees. ID will be required upon check-in. Retired military ID's do not qualify.

## SPECIAL NEEDS

NDIA supports the Americans with Disabilities Act of 1990. Attendees with special needs or concerns should call (703) 247 - 9463 by October 22, 2010. Please refer to the Combat Vehicles Conference when calling.

## ATTIRE

Industry/Civilian: Business Casual  
Active Duty Military: Working Uniform (Class B or Service equivalent)

# 2011 COMBAT VEHICLES CONFERENCE

## OVERVIEW

As worldwide terrorism persists and U.S. Armed Forces remain engaged in operations spanning the full spectrum of conflict, military services continue to pursue a balanced effort to sustain a capable current force while preparing for future materiel requirements. With the bulk of our ground forces currently engaged in stability operations, the future role of Combat Vehicles has come under intense scrutiny.

This year's Combat Vehicles Conference is focused to provide insights into defining an investment strategy for the future of heavy forces. The conference will include program updates on selected Army and Marine Corps Combat Vehicles from the respective program experts.

## REGISTRATION FEES

All attendees must register and pay the registration fee. Payment must be made at the time of registration. Registration includes admission to the general session, coffee breaks on Tuesday and Wednesday, opening reception on Monday, continental breakfast on Tuesday, lunch on Tuesday, reception on Tuesday, and continental breakfast on Wednesday.

| CONFERENCE<br>REGISTRATION FEES      | EARLY<br>(BEFORE<br>SEPT. 9) | REGULAR<br>(SEPT. 9 THRU<br>OCT. 13) | LATE<br>(AFTER<br>OCT. 13) |
|--------------------------------------|------------------------------|--------------------------------------|----------------------------|
| GOVERNMENT/<br>ACADEMIA/ ALLIED GOV. | \$400                        | \$440                                | \$485                      |
| INDUSTRY NDIA MEMBER                 | \$615                        | \$680                                | \$750                      |
| NON-MEMBER INDUSTRY                  | \$690                        | \$760                                | \$840                      |

## REGISTRATION

3 Ways to Register!

**Online at:**

<http://www.ndia.org/meetings/2620>

**By Mail to:**

NDIA, Event #2620  
2111 Wilson Blvd., Suite 400  
Arlington, VA 22201

**By Fax to:**

(703) 522 - 1885

## CANCELLATION POLICY

All refund, cancellation, and substitution requests must be submitted in writing no later than **October 13, 2011** to NDIA, attn: Alexis Schwartz via email to [aschwartz@ndia.org](mailto:aschwartz@ndia.org) or fax to (703) 522 - 1885. All cancellations received before **October 13, 2011** will receive a full refund minus a \$75 cancellation fee. Refunds will not be accepted after October 13, 2011 and will not be given for no shows. Substitutions welcome in lieu of cancellation.

## INQUIRES:

Ms. Alexis Schwartz  
Director, International Division  
(703) 247 - 9463  
[aschwartz@ndia.org](mailto:aschwartz@ndia.org)

Ms. Britt Bommelje, CMP  
Director, Operations  
(703) 247-2587  
[bbommelje@ndia.org](mailto:bbommelje@ndia.org)



## MONDAY, OCTOBER 24, 2011

3:00 PM - 5:00 PM **REGISTRATION OPEN**

## TUESDAY, OCTOBER 25, 2011

7:00 AM - 6:45 PM **REGISTRATION OPEN**

7:00 AM - 8:00 AM **CONTINENTAL BREAKFAST**

8:00 AM - 12:00 PM **GENERAL SESSION - SESSION I**

8:00 AM **ADMINISTRATIVE REMARKS**

► LTG John Caldwell, USA (Ret), *Parametric Technologies Corporation; The Spectrum Group; Chairman, Combat Vehicles Division, NDIA*

8:10 AM **GENERAL DONN A. STARRY AWARD PRESENTATION**

8:30 AM **WELCOME REMARKS**

► MG Kurt Stein, USA, *Commanding General, TACOM LCMC, U.S. Army*

8:45 AM **PEO'S PERSPECTIVE**

► Mr. Scott Davis, *Program Executive Officer Ground Combat Systems, U.S. Army*

9:30 AM **KEYNOTE ADDRESS**

► LTG Keith Walker, USA, *Deputy Commanding General, Futures/Director, Army Capabilities Integration Center, United States Army Training and Doctrine Command*

10:15 AM **MORNING NETWORKING BREAK**

10:45 AM **ACQUISITION KEYNOTE ADDRESS**

► MG John Bartley, USA, *Program Executive Officer, Integration, U.S. Army*

11:30 AM **COMBAT VEHICLES RESEARCH AND DEVELOPMENT**

► Dr. Grace Bochenek, *Director, U.S. Army RDECOM-TARDEC*

12:15 PM **NETWORKING LUNCH**

1:15 PM - 5:30 PM **GENERAL SESSION - SESSION II**

1:15 PM **MARINE CORPS KEYNOTE ADDRESS**

► BrigGen Daniel O'Donohue, USMC, *Director, Combat Development Directorate, U.S. Marine Corps*

2:00 PM **PANEL DISCUSSION  
MARINE CORPS PANEL**

Moderator:

► Mr. Gene Meredith, USMC (Ret), *Director GCS Projects and Global Information Technology Systems Management, General Dynamics Land Systems*

Panelists:

► LtCol (Sel) Ethan Smith, USMC, *PM Tank Systems, MARCORSYSCOM*

► Col Keith Moore, USMC, *PM Advanced Amphibious Assault, Marine Corps PEO Land Systems*

► Maj Henry Kayser, USMC, *Operations Officer, LAV PMO, MARCORSYSCOM*

### SCHEDULE AT A GLANCE

MONDAY, OCTOBER 24, 2011

3:00 PM - 5:00 PM

**Registration Open**

TUESDAY, OCTOBER 25, 2011

7:00 AM - 7:00 PM

**Registration Open**

7:00 AM - 8:00 AM

**Continental Breakfast**

*Location: Grand Foyer*

8:00 AM - 12:15 PM

**General Session I**

*Location: Grand Ballroom*

10:15 AM - 10:45 AM

**Morning Networking Break**

*Location: Grand Foyer*

12:15 PM - 1:15 PM

**Lunch**

*Location: Regency Ballroom*

1:15 PM - 5:30 PM

**General Session II**

*Location: Grand Ballroom*

3:30 PM - 4:00 PM

**Afternoon Networking Break**

*Location: Grand Foyer*

5:30 PM - 7:00 PM

**Annual Conference Reception**

*Location: Grand Foyer*

WEDNESDAY, OCTOBER 26, 2011

7:00 AM - 12:00 PM

**Registration Open**

7:00 AM - 8:00 AM

**Continental Breakfast**

*Location: Grand Foyer*

8:00 AM - 9:45 AM

**Breakout Session I**

*Locations: Springwells Ballroom, Dearborn Ballroom, and Desoto Room*

9:45 AM - 10:15 AM

**Morning Networking Break**

*Location: Grand Foyer*

10:15 AM - 12:00 PM

**Breakout Session II**

*Locations: Springwells Ballroom, Dearborn Ballroom, and Desoto Room*

12:00 PM

**Conference Concludes**

# 2011 COMBAT VEHICLES CONFERENCE CONFERENCE AGENDA

Combat Team

12:00 PM **CONFERENCE**  
ONCLUDES

## COMBAT VEHICLES DIVISION INFORMATION

### Chairman

LTG John S. Caldwell, USA (Ret)  
Parametric Technologies Corporation  
The Spectrum Group

### Steering Committee

Col Reed T. Bolick, USMC (Ret)  
Cypress International

Mr. Anthony Desmond  
U.S. Army TACOM

Mr. Steve Howson  
BAE Systems

Mr. Andy Mills  
Alcoa Defense

Mr. Douglas Morrison  
DuPont Company

Mr. Michael Peck  
General Dynamics Land Systems

Mr. Roy Perkins  
BAE Systems

Mr. Chuck Prikopa  
BAE Systems

Mr. George Sanchez  
General Dynamics, Corp.

# TUESDAY, OCTOBER 25, 2011 (continued)

3:30 PM

**AFTERNOON NETWORKING BREAK**

4:00 PM

## PANEL DISCUSSION **WAR FIGHTER PANEL**

**Moderator:** MG Julian Burns, USA (Ret)  
*Vice President, Business Development & Marketing,  
BAE Systems*

### Panelists:

- Maj Daniel Hughes, USMC, *Instructor, Armor School, U.S. Army's Maneuver Center of Excellence Ft. Benning, GA; Former Tank Company Commander in Afghanistan*
- LTC Jay Gallivan, USA, *USA Brigade Training Team, NTC*
- CPT James Ianitelli, USA, *Assistant Product Manager, JERRV/Systems Integration, TACOM*
- SGM Brandon Jenks, USA, *Sergeant Major for the TRADOC Capability Manager, Stryker Brigade Combat Teams, Fort Benning, GA*

5:30 PM - 7:00 PM

**ANNUAL CONFERENCE NETWORKING RECEPTION**

# WEDNESDAY, OCTOBER 26, 2011

7:00 AM - 12:00 PM

**REGISTRATION OPEN**

7:00 AM - 8:00 AM

**CONTINENTAL BREAKFAST**

8:00 AM

**BREAKOUT SESSIONS WITH PM'S (2 ROOMS RUNNING CONCURRENTLY)**

- COL William Sheehy, USA, *Project Manager, Heavy Brigade Combat Team*
- Mr. Davis Dopp, *Project Manager, Stryker Brigade Combat Team*

9:45 AM

**MORNING NETWORKING BREAK**

10:15 AM

**BREAKOUT SESSIONS WITH PM'S (2 ROOMS RUNNING CONCURRENTLY)**



## EVENT #2620 ► NDIA REGISTRATION FORM

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION ► 2111 WILSON BOULEVARD, SUITE 400 ► ARLINGTON, VA 22201-3061  
(703) 522-1820 ► (703) 522-1885 FAX ► WWW.NDIA.ORG

**2011 COMBAT VEHICLES CONFERENCE ► HYATT REGENCY DEARBORN  
DEARBORN, MI ► OCTOBER 24-26, 2011**

### 3 WAYS TO SIGN UP:

1. Online with a credit card at [www.ndia.org](http://www.ndia.org)
2. By fax with a credit card - Fax: (703) 522-1885
3. By mail with a check or credit card

► Address  
Change Needed

NDIA Master ID/Membership # \_\_\_\_\_ Social Security # \_\_\_\_\_  
(If known - hint: on mailing label above your name) (Last 4 digits - optional)

Prefix (e.g. RADM, COL, Mr., Ms., Dr., etc.) \_\_\_\_\_

Name: First \_\_\_\_\_ MI \_\_\_\_\_ Last \_\_\_\_\_

Military Affiliation \_\_\_\_\_ Nickname \_\_\_\_\_  
(e.g. USMC, USA (Ret.) etc.) (For meeting badges)

Title \_\_\_\_\_

Organization \_\_\_\_\_

Street Address \_\_\_\_\_

Address (Suite, PO Box, Mail Stop, Building, etc.) \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Country \_\_\_\_\_

Phone \_\_\_\_\_ Ext. \_\_\_\_\_ Fax \_\_\_\_\_

E-Mail \_\_\_\_\_

Signature\* \_\_\_\_\_ Date \_\_\_\_\_

#### PREFERRED WAY TO RECEIVE INFORMATION

Conference Information ► Address above ► Alternate (Print address below) ► E-mail  
Subscriptions ► Address above ► Alternate (Print address below)

Alternate Street Address \_\_\_\_\_

Alternate Address (Suite, PO Box, Mail Stop, Building, etc.) \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Country \_\_\_\_\_

\* By your signature above, you consent to receive communications sent by or on behalf of NDIA, its Chapters, Divisions and affiliates (NTSA, AFEI, PSA, WID) through regular mail, e-mail, telephone or fax. NDIA, its Chapters, Divisions and affiliates do not sell data to vendors or other companies.

#### CONFERENCE REGISTRATION FEES

|   | Early<br>before 9-8 | Regular<br>9-9<br>thru<br>10-13 | Late<br>after 10-13 |
|---|---------------------|---------------------------------|---------------------|
| Government/Academia <sup>1</sup>                              | \$400               | \$440                           | \$485               |
| Industry NDIA Member and<br>affiliates (AFEI, NTSA, PSA, WID) | \$615               | \$680                           | \$750               |
| Industry non-NDIA member <sup>2</sup>                         | \$690               | \$760                           | \$840               |

All refund, cancellation, and substitution requests must be submitted in writing no later than October 13, 2011 to NDIA, attn: Alexis Schwartz via email to [aschwartz@ndia.org](mailto:aschwartz@ndia.org) or fax to (703) 522-1885. All cancellations received before October 13, 2011 will receive a full refund minus a \$75 cancellation fee. Refunds will not be accepted after October 13, 2011 and will not be given for no shows. Substitutions welcome in lieu of cancellation.

<sup>1</sup> Includes a free three-year NDIA membership and subscription to National Defense magazine for military and government employees.

► No, do not sign me up for the free government membership.

<sup>2</sup> Registration fees for non-NDIA (or affiliate) members include a one-year non-refundable NDIA membership —\$15.00 will be applied for your 12 month subscription to National Defense magazine.

**Substitutions welcome in lieu of cancellations.**

#### PAYMENT OPTIONS

► Check (Payable to NDIA - Event #2620) ► Government PO/Training Form # \_\_\_\_\_

► VISA ► MasterCard ► American Express ► Diners Club ► Cash

If paying by credit card, you may return by fax to (703) 522-1885.

□□□□□□□□□□□□□□□□

Credit Card Number

□□/□□

Exp. Date

Signature \_\_\_\_\_ Date \_\_\_\_\_



**BY COMPLETING THE FOLLOWING,  
YOU HELP US UNDERSTAND WHO IS  
ATTENDING OUR EVENTS.**

#### PRIMARY OCCUPATIONAL CLASSIFICATION. Check ONE.

- Defense Business/Industry
- R&D/Laboratories
- Army
- Navy
- Air Force
- Marine Corps
- Coast Guard
- DOD/MOD Civilian
- Government Civilian (Non-DOD/MOD)
- Trade/Professional Assn.
- Educator/Academia
- Professional Services
- Non-Defense Business
- Other \_\_\_\_\_

#### CURRENT JOB/TITLE/POSITION.

Check ONE.

- Senior Executive
- Executive
- Manager
- Engineer/Scientist
- Professor/Instructor/Librarian
- Ambassador/Attaché
- Legislator/Legislative Aide
- General/Admiral
- Colonel/Navy Captain
- Lieutenant Colonel/Commander/ Major/Lieutenant Commander
- Captain/Lieutenant/Ensign
- Enlisted Military
- Other \_\_\_\_\_

Year of birth \_\_\_\_\_  
(optional)

#### QUESTIONS, CONTACT:

**ALEXIS SCHWARTZ,  
DIRECTOR, INTERNATIONAL DIVISION**

**PHONE:** (703) 247-9463

**E-MAIL:** [ASCHWARTZ@NDIA.ORG](mailto:ASCHWARTZ@NDIA.ORG)

#### MAIL REGISTRATION TO:

NDIA - EVENT #2620  
2111 WILSON BOULEVARD  
SUITE 400  
ARLINGTON, VA 22201

**FAX TO:** (703) 522-1885



# Combat Vehicle Modernization

***Changing Business Practices to  
Deliver Cutting-edge Capabilities***

***2011 Combat Vehicle Conference***

**MG John Bartley**

25 October 2011



DESIGN • DEVELOP • DELIVER • DOMINATE  
SOLDIERS AS THE DECISIVE EDGE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.



# Integrate & Synchronize: BIG “A” Acquisition *Delivering Capabilities*



Requirements

Resources

Acquisition

Sustainment

***Inherently Linked!!!!***

- Fielding Networked Systems that are COE Compliant
- Aligning CPRs with CSBs
- Challenging Requirements
- Adequate and streamlined testing
- Establishing Affordability Targets as KPPs [(T)&(O)]
- Willingness to Trade Performance to Hold Cost & Schedule
- Executing Incremental Development Strategies

## **One Changing Paradigm**

***Capability at Any Cost!  
to  
What Capability at What  
Cost & Schedule?***

***Collaboration Absolutely Necessary – Industry Feedback Essential!!!***



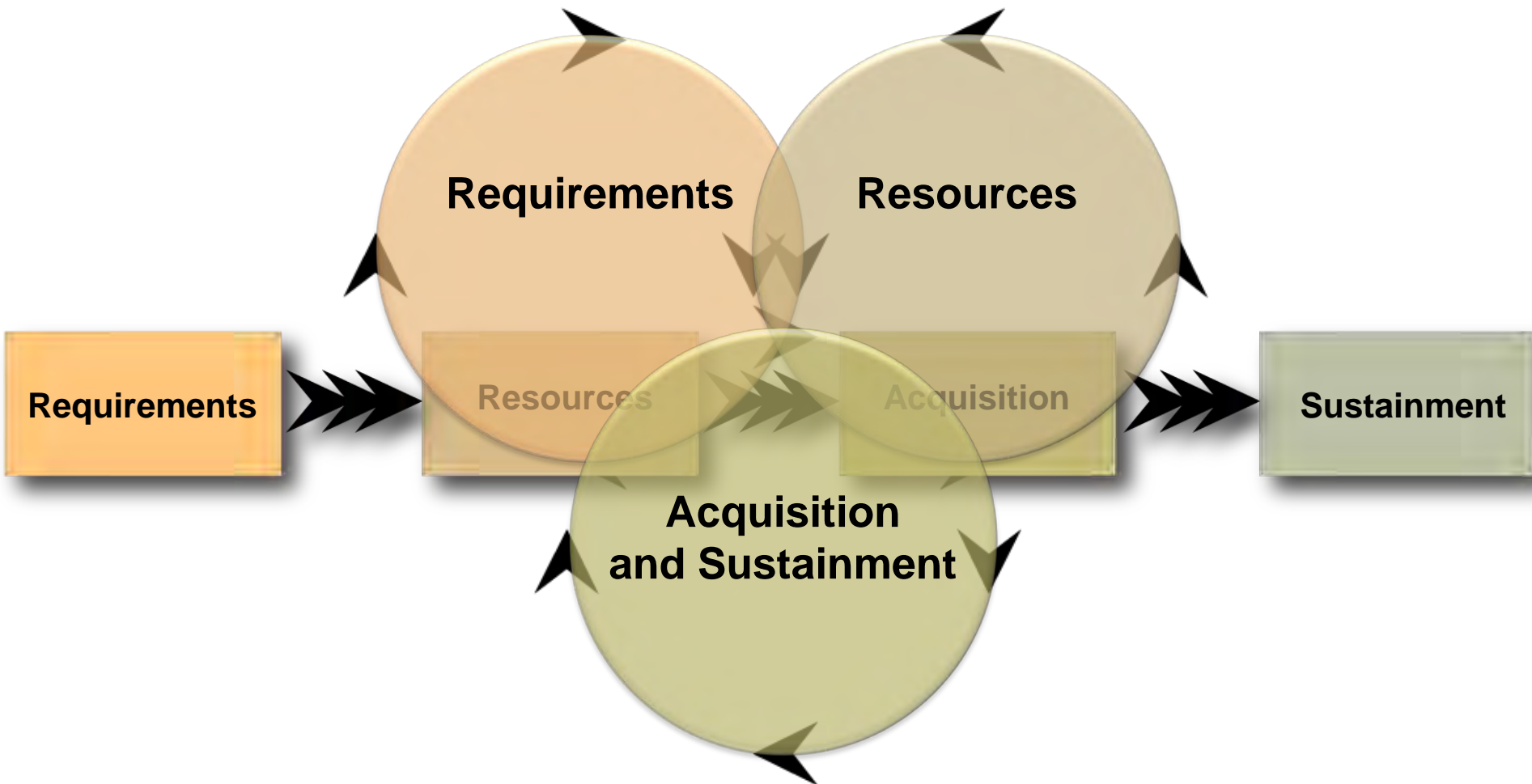
DESIGN • DEVELOP • DELIVER • DOMINATE  
SOLDIERS AS THE DECISIVE EDGE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.





# Delivering Capabilities: BIG “A” Acquisition



**PMs must operate across the full spectrum of Acquisition**



DESIGN • DEVELOP • DELIVER • DOMINATE  
SOLDIERS AS THE DECISIVE EDGE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.



# The Army's Combat Vehicle Modernization Strategy

---



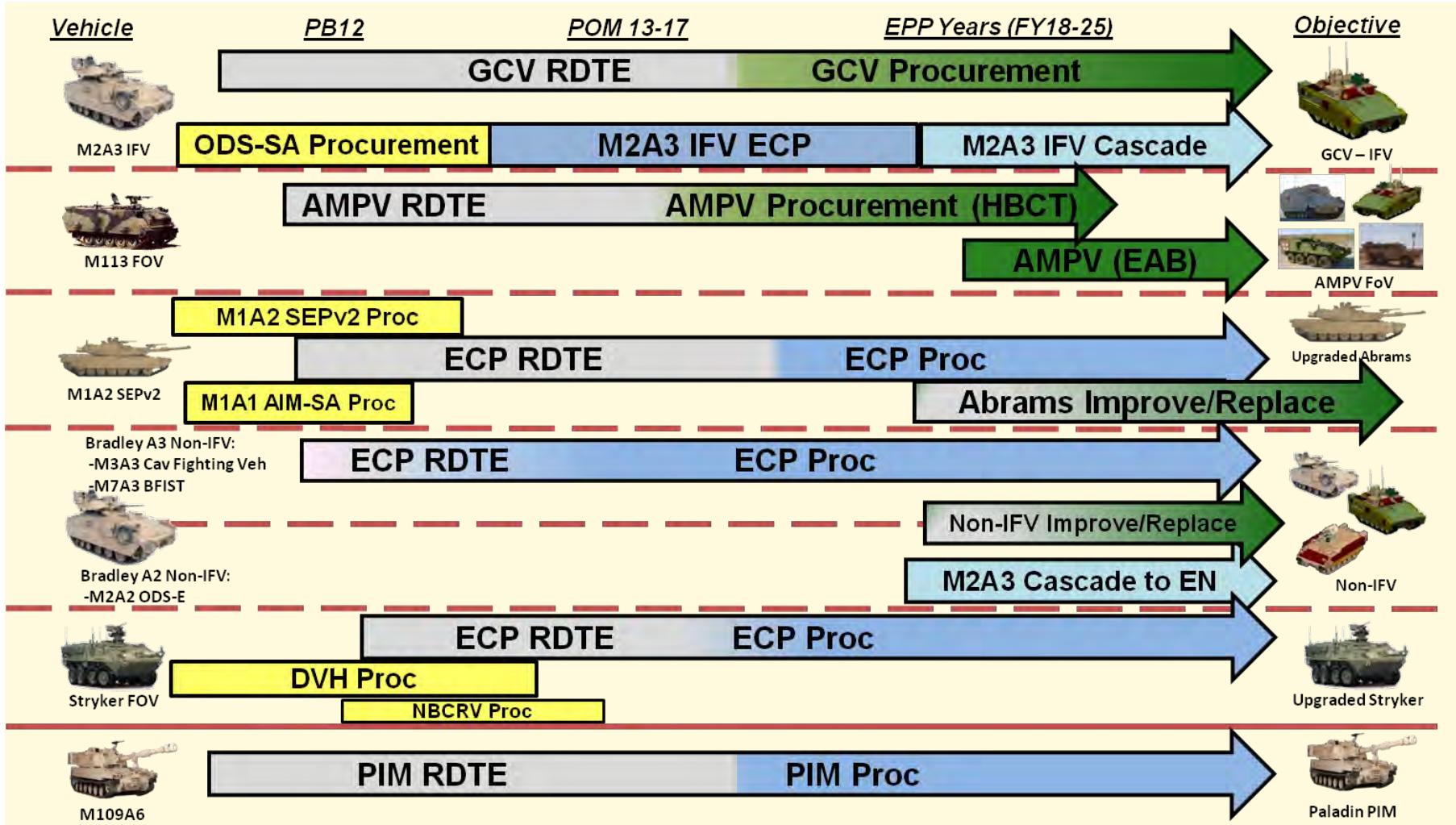
## **Transform, Replace and Improve\***

- **Transform --- acquire the Ground Combat Vehicle to provide our Soldiers the capabilities they need to fight and win today and in the future;\***
- **Replace our M113 Family of Vehicles with a platform able to meet the demands of today's Contemporary Operational Environment;**
- **\* and Improve our Abrams, non IFV Bradleys, Paladin and Stryker Vehicles so they remain relevant and capable.**





# Combat Vehicle Modernization Strategy Roadmap





# Combat Vehicle Modernization



- Modernizing the fleet to improve capability gaps in **Protection, Network, Mobility** and **Lethality**
- ...while ***regaining Space, Weight, Power and Cooling (SWaP-C)*** margin required to integrate planned and future upgrades
- Modernizing to include modular and open architecture with growth potential to support integration of future capabilities
- Development and fielding of the GCV IFV, Paladin PIM and determining the replacement strategy for the Armored Personnel Carrier (M113) Family of Vehicles (FoV) remain the Army's priority efforts within this portfolio
- Fiscal realities and balancing across CVM portfolio support combination of developmental and ECP approaches





# GCV IFV MS A ADM Summary



- **Three-pronged approach driving toward an affordable set of requirements to support a well-informed MS B**
  - AoA Dynamic Update
  - Assessment of selected Non-Developmental Vehicles
  - Technology Development Strategy contractor efforts
- **Reinforced Army Cost and Schedule Targets**
  - \$13M AUPC
  - \$200/mile O&S
  - Seven years to first production vehicle
- **Full and Open Competition for the EMD phase**

## Key Aspects of GCV Strategy Remain Unchanged

- Driving to a “Fully Informed” MS B
- Incremental approach to attain capability with growth for future capabilities
- TD phase drives to affordable, achievable set of capability / requirements







# Challenges – Modernizing in Lean Times

---



- Today's reality: continued fiscal uncertainty and impacts to modernation requires an improved acquisition model
- Maintaining appropriate industrial base as operations wind down
- Working more closely with you to maximize capabilities





# Army Modernization – Myths and Truths



## ACQUISITION TRANSFORMATION

- The budget environment we now face calls for a greater emphasis on affordability as part of a new balance between national security and fiscal discipline. Acquisition reform and the pursuit of efficiencies go hand-in-hand.
- The acquisition process is truly a team sport incorporating inputs from across DoD. (Requirements, resourcing, program execution, testing). Reform is really about harmonizing these inputs throughout the acquisition cycle.

**Myth:** Army has lived “high on the hog” over the last decade, now it’s the other services’ turn.

**Truth:** Army began with a \$56B shortfall in equipment (2001 Holes in the Yard).  
Army priority over the last decade has been the war fight.  
We have incrementally improved our existing equipment.

**Myth:** The Army can’t acquire anything, why invest in them?

**Truth:** Army modernization successes:

|   |  |
|---|--|
| • MRAP and MRAP-ATV                               | • Helicopter Improvements                              |
| • 9 Body Armor Improvements                       | • Protected medium and heavy truck fleets (Up-Armored) |
| • Precision Munitions                             | • Stryker Double-V Hull                                |
| • C-IED (CREW Devices)                            | • 3 New Sniper Rifles                                  |
| • New Camouflage Uniforms                         | • M4 Improvements                                      |
| • Warfighter Information Network-Tactical (WIN-T) | • UAVs (Grey Eagle, Shadow, Raven)                     |
| • Joint Battlefield Capability-Platform (JBC-P)   | • Light-weight Crew-served Weapons                     |
| • Joint Capability Release (JCR)                  | • Combat Vehicle Improvements                          |





# **PEO GCS Portfolio Overview**

## **Combat Vehicle Conference**

**Mr. Scott Davis**

**PEO GCS**

**25 OCT 2011**



# Agenda

- Portfolio Overview
- Capability Portfolio Analysis Tool (CPAT)
- Commonality Potential
- Achieving Efficiencies Together
- Challenges & Opportunities





# Program Executive Office Ground Combat Systems



2,338  
Abrams Tanks\*



- Abrams Tank
- Bradley Fighting Vehicle
- Knight
- PIM/Paladin / FAASV
- M113
- M88 Recovery Vehicle

4,000  
Robotic  
Platforms



(Army & Marine Corps)

- XM1216 SUGV
- M160
- MARCbot
- PackBot Family
- TALON Family
- Mini – EOB (SUGV-310)

## PEO GCS PORTFOLIO

3,894  
Stryker  
Platforms



- Stryker Family of 10 vehicles

Ground  
Combat  
Vehicle



4,559 Bradley\*  
465 Knight



969  
Self-Propelled  
Howitzer  
Systems\*



3,901 M113 FoV\*  
1,056 M88 Recovery  
Vehicles\*

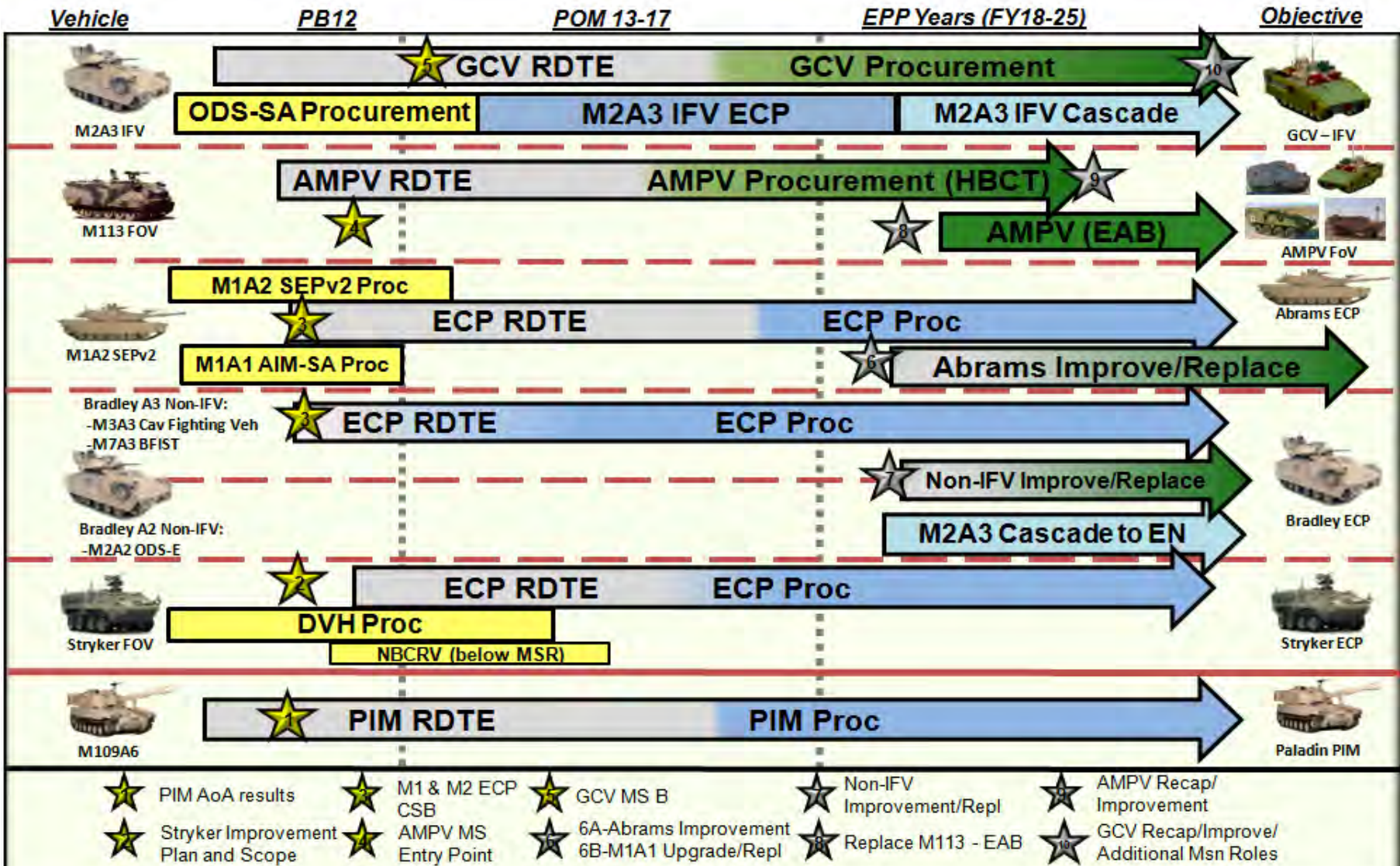


\* Does not include systems in long term storage





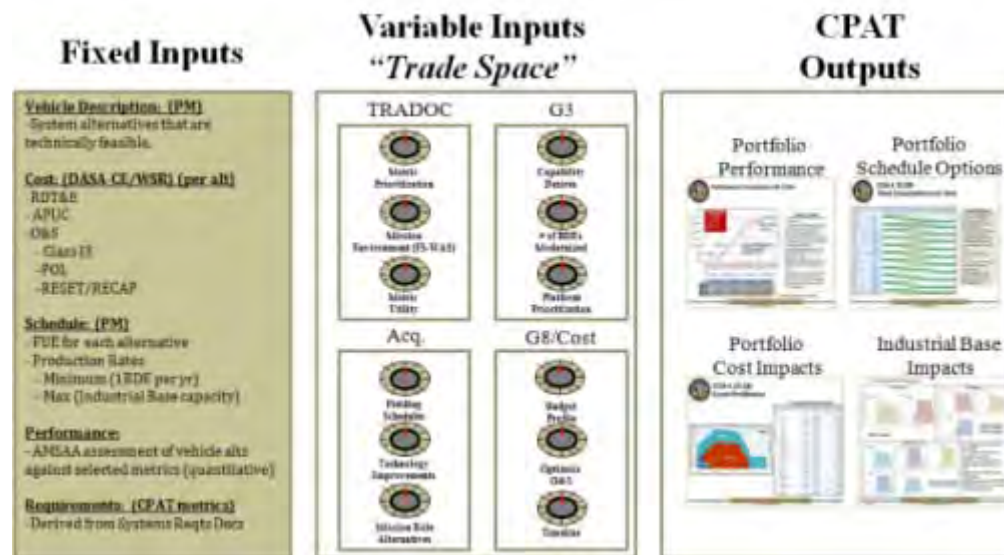
# Combat Vehicle Modernization Strategy





# Capability Portfolio Analysis Tool (CPAT)

- **Purpose:** Establish an analytical approach to identify the optimum courses of action (Cost, Schedule, and Performance) for PEO GCS portfolio investment



- **Excursion Analysis Objectives:**

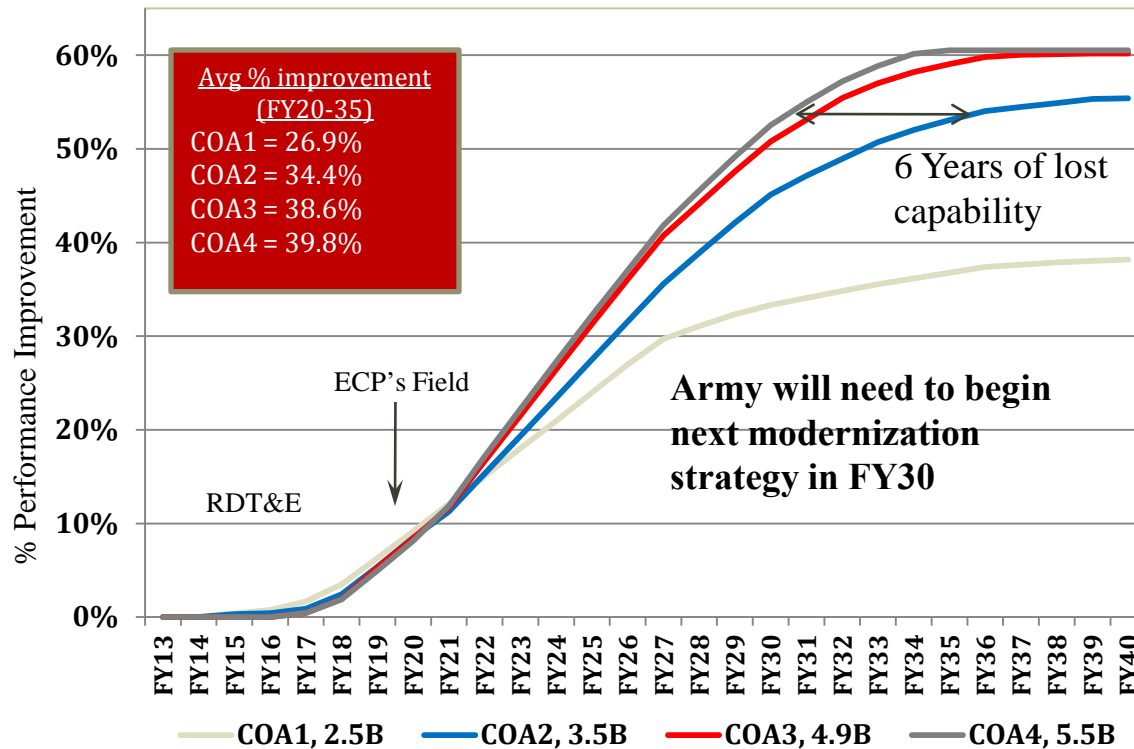
- Conduct analysis of current program alternatives
  - Updated performance and cost data
- Outline the impacts of Budget changes to the Combat Vehicle Modernization Strategy
  - Vary Budget based on HQDA G8 guidance
- Provide the analytical underpinnings that support an achievable and affordable Combat Vehicle Modernization Strategy
  - Define the holistic implications of various courses of action based on different budget profiles

***I believe it is a great tool to show leadership multiple COAs and the impacts/costs of various approaches. . . . This could be a game changer across multiple portfolios."* GEN Chiarelli 30 AUG 11**



# CPAT Performance Comparison (Example)

## Performance Vs. Time



|                    | COA1, 2.5B         | COA2, 3.5B         | COA3, 4.9B         | COA4, 5.5B         |
|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Acquisition</b> | \$ 52,071,766,991  | \$ 65,519,571,991  | \$ 80,291,026,991  | \$ 81,447,842,991  |
| <b>O&amp;S</b>     | \$ 69,232,189,786  | \$ 79,982,847,786  | \$ 74,284,175,786  | \$ 73,290,884,786  |
| <b>RDT&amp;E</b>   | \$ 3,496,500,000   | \$ 8,778,900,000   | \$ 9,291,900,000   | \$ 9,291,900,000   |
| <b>Total</b>       | \$ 124,800,456,777 | \$ 154,281,319,777 | \$ 163,867,102,777 | \$ 164,030,627,777 |

### Summary of Findings

- Maximum achievable performance is ~60% in 2040.
- Reduction of the budget to \$2.5B will result in losing Abrams Modernization and ~22% of Force Effectiveness.
- Reducing budget profiles extend the production plans and will force the Army to a minimum sustaining rate rather than a optimal production rate.
- Lower budget profiles drive O&S cost higher because they are maintaining older systems longer.
- Creating a common platform (GCV chassis) that provides significant growth and protection drove the model in its COAs
- Key capability characteristics (Net, FP, and Growth) are achievable through modernization in spite of constricting budgets when able to conduct trades across the portfolio.

OUR MISSION IS OUR WARFIGHTERS' FUTURE





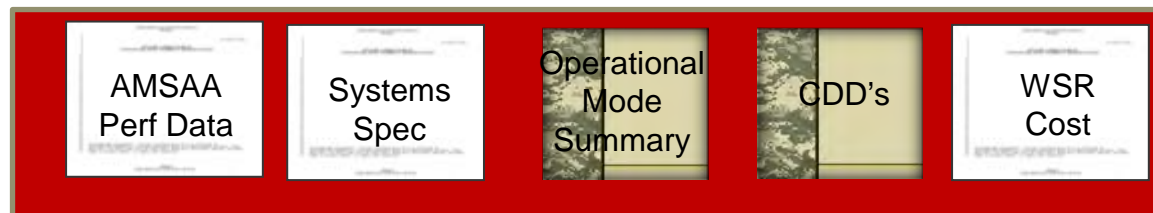
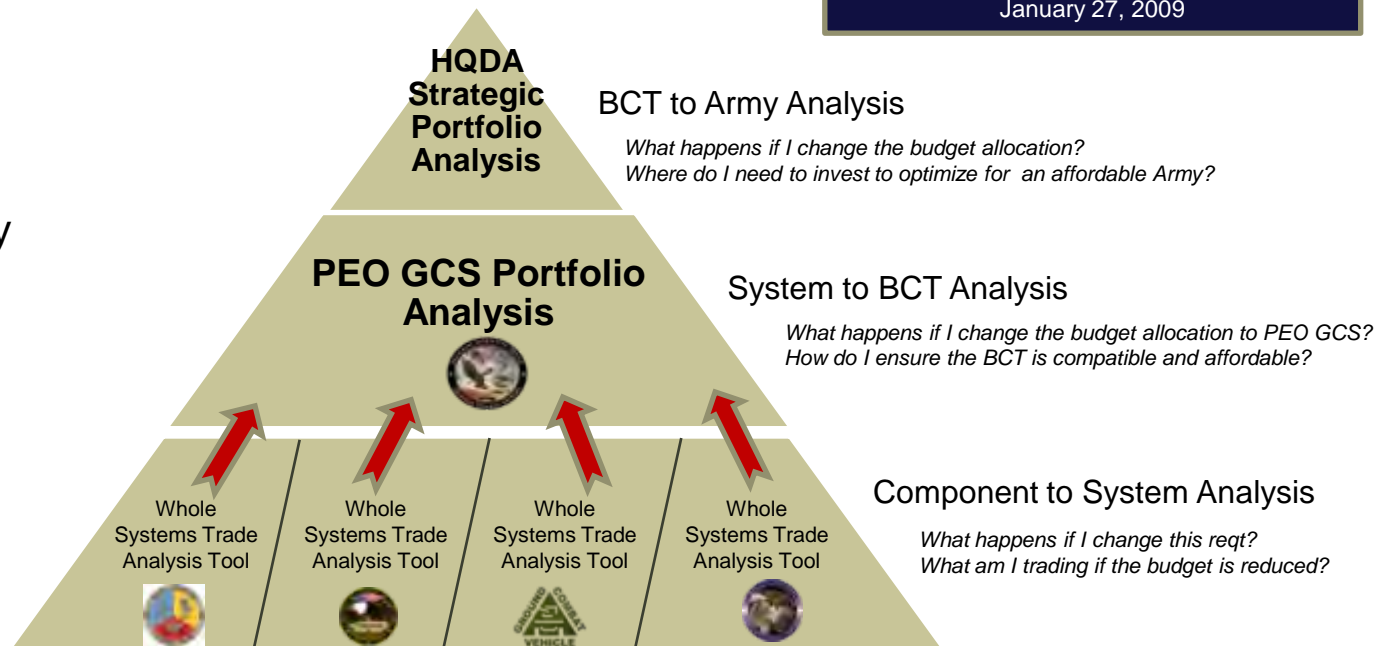
# Portfolio Analysis

## Motivation - SECDEF Priority

*"Chief among institutional challenges facing the Department is acquisition...I feel that many programs that cost more than anticipated are built on an inadequate initial foundation."*

Secretary of Defense Robert M. Gates  
January 27, 2009

- Common Architecture
- Scalable
- Defendable decision analysis methodology
- Quantifiable budget implications
- Balancing Cost, Schedule and Performance at each echelon



Common Data Picture

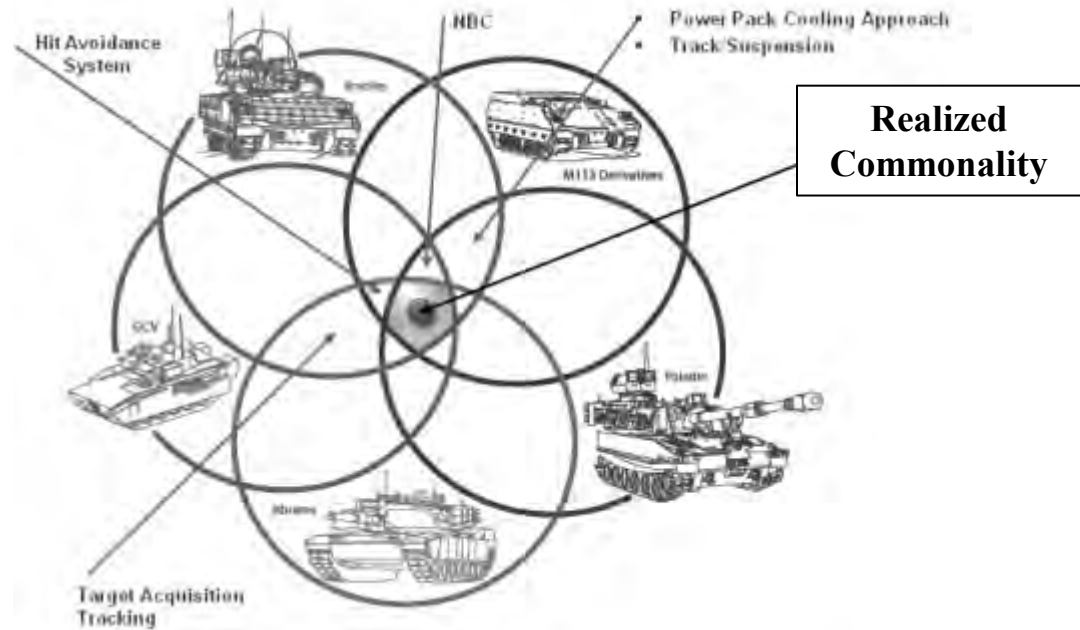
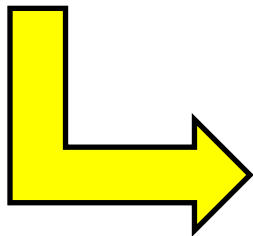
OUR MISSION IS OUR WARFIGHTERS' FUTURE



# Commonality Potential

## Current Context

- Almost identical functional architectures across major ground combat systems (e.g. Victory & COE)
- Industry/OEMs moving away from vertical integration towards selection of suppliers based on best value
- COTS provides opportunities for commonality, cost savings, and tech refresh
- Declining budgets



## Future Benefits of Commonality

- Reduce lifecycle cost and improve efficiency through:
  - Economies of scale
  - Increased competition
  - Streamlined logistics supply chain
  - Improved ease of integration for upgrades
  - Obsolescence mitigation
- Make materiel solutions more affordable and adaptable
- Operational impact for the Warfighter

OUR MISSION IS OUR WARFIGHTERS' FUTURE





# Achieving Commonality

- Acquisition Approach
  - Explicit Commonality directives in Acquisition contracts
    - Government pays for Commonality analysis as part of performance spec
    - Government reserves right to direct common standard or component
- System Engineering
  - On going PEO led system engineering focused on coordinating standards across fleet
  - Approved standards will be directed if appropriate
  - PEO led Configuration Control Board will function as oversight on system trades, and major materiel solutions for obsolescence and new programs
- Business Case Development
  - Government internal analysis on a case by case basis



# Achieving Efficiencies Together

- Current economic and budget environment demands new ways to drive down costs in programs
- Affordability is now (and will remain) the major driver in program decisions
- Dr Carter's Better Buying Power initiatives fully implemented over past year and remain guide post to drive affordability and control cost growth
- We need your help to determine new ideas, as well as leverage existing programs (i.e. Value Engineering Change Proposals) to reduce cost and improve quality
- Our focus is to drive down cost, not profit...we will incentivize to find “best value” and look for Industry’s help to get the most for every taxpayer dollar



# Challenges & Opportunities

- Modernizing the ground combat vehicle portfolio in an environment of fiscal austerity
  - Must be mindful of cost and providing best value...RFPs must incentivize behavior
- Common Architecture, standards and interfaces
  - Open/Non Proprietary – minimizes “not invented here” syndrome
  - Weighted in multiple RFPs to facilitate efficiencies at 2<sup>nd</sup> & 3<sup>rd</sup> Tier Vendor level
  - Encourages lower tier investment due to common application across a larger base
  - Potentially increases vendor base and interest from nontraditional suppliers
  - Facilitates innovation and investment (iPhone model)
- Formation/Fleet Trades
  - Synchronizing requirements across a formation to drive common solutions (i.e. optics & sights having same range/detection/recognition)
  - Facilitates quantity buys if extended to preferred parts or common specifications . . .
  - Opportunity is now – this window will not happen again

***We need your insights & support to turn this into reality***



OUR MISSION IS OUR WARFIGHTERS' FUTURE



# Achieving Commonality

- Achieved through:
  - Cross-platform systems engineering and defining opportunities for common functional and physical requirements and architectures
  - Development and base lining of functional and physical architecture requirements for PEO-wide use (when financially advantageous to do so)
  - Executing proof-of-principle demonstrations of common architecture requirements on multiple PEO platforms
  - Common materiel solution/ component options developed through application of sound technical and business cases analyses and validated using proof-of-principle demonstrations
- Infrastructure to support commonality includes:
  - New collaboration mechanisms (Common Operating Environment, VICTORY)
  - Ensure cross collaboration with other PEO and industry partners through the use of IPTs and working groups
- Implemented when specifications for common materiel solutions can be competed and integrated across ground domain systems





# PEO GCS Modernization Schedule (Pre Decisional)

|             | FY11        | FY12                   | FY13          | FY14     | FY15 | FY16                          | FY17                | FY18         | FY19 | FY20               | FY21 |
|-------------|-------------|------------------------|---------------|----------|------|-------------------------------|---------------------|--------------|------|--------------------|------|
| <br>GCV IFV | <br>MS A    |                        | <br>MS B      |          |      |                               | <br>MS C            |              |      | <br>GCV IFV FUE    |      |
| <br>Abrams  |             | <br>ECP Contract Award | <br>PDR       | <br>CDR  |      | <br>Production Contract Award |                     |              |      | <br>Abrams ECP FUE |      |
| <br>Bradley |             | <br>EMD Contract Award | <br>PDR       | <br>CDR  |      | <br>Production Contract Award | <br>Bradley ECP FUE |              |      |                    |      |
| <br>AMPV    |             | <br>MDD                |               | <br>MS B |      |                               | <br>MS C            | <br>AMPV FUE |      |                    |      |
| <br>Stryker |             | <br>NBCRV FRP          |               |          |      |                               |                     |              |      |                    |      |
| <br>PIM     | <br>IPR DAB |                        | <br>MS C      |          |      |                               | <br>PIM FUE         |              |      |                    |      |
| <br>SUGV    |             |                        | <br>MS C/ FRP |          |      |                               |                     |              |      |                    |      |



## **PEO GCS Mission**

Execute lifecycle management of the world's best ground combat systems in a collaborative learning environment by developing, acquiring and supporting modernized and affordable systems with common integrated capabilities, always focused on the needs of the Joint Warfighter

## **PEO GCS Vision**

A highly collaborative organization of Acquisition professionals that leverages the unique expertise of critical partners to deliver the most adaptable, affordable and integrated unit capabilities to the Joint Warfighter

OUR MISSION IS OUR WARFIGHTERS' FUTURE



# **PM Stryker Brigade Combat Team (SBCT)**

Mr. David Dopp  
Project Manager

U.S. Army, TACOM  
Phone: (586) 282-2001  
Email: david.j.dopp2.civ@mail.mil

OUR MISSION IS OUR WARFIGHTERS' FUTURE

Distribution Statement A: Approved for public release; distribution is unlimited



# Stryker Family of Vehicles



M1126  
Infantry Carrier Vehicle (ICV) - 130



M1135  
NBC Reconnaissance Vehicle (NBCRV) - 3



M1134  
Anti Tank Guided Missile (ATGM) - 10

Total in a  
Brigade:  
332

Current Fleet  
Delivered:  
3,894

Remaining  
On Order:  
292



M1127  
Reconnaissance Vehicle (RV) - 52



M1128  
Mobile Gun System (MGS) - 29



M1129  
120mm Mounted  
Mortar Carrier (MCV) - 37



M1130  
Commander's Vehicle (CV) - 28



M1133  
Medical Evacuation Vehicle (MEV) - 16



M1132  
Engineer Squad Vehicle (ESV) - 13



M1131A1  
Fire Support Vehicle (FSV) - 14

## Commonality

Common Operating Picture

Common Chassis & Drive Train

Common KPP's

Common Survivability

Common TMDE, Spare Parts, Tools  
& Skills

## Bottom Line

*Stryker provides enhanced,  
Battle-proven capabilities to warfighters*

**Over 28 million miles in Combat  
Currently on 15<sup>th</sup> SBCT Deployment**

OUR MISSION IS OUR WARFIGHTERS' FUTURE





# Supporting the ARFORGEN Process

## Current Operations

### BDE CONUS/OCONUS

Fort Bliss, TX  
Fort Hood, TX  
FtIG, PA  
Fort Wainwright, AK  
Fort Lewis, WA (3ea BDE)  
Schofield Barracks, HI  
Vilseck, DE



### COMMAND

Warren, MI  
Washington D.C.



### DEPLOYED BDE

OEF



### PRODUCTION

Anniston Army Depot, AL  
Lima, OH  
London, Ontario, CA



### BATTLE DAMAGE REPAIR

Anniston Army Depot, AL  
Qatar



### RESET FACILITIES

Anniston Army Depot, AL  
Fort Lewis, WA  
Qatar

### SPOD/APOD

### OPS

San Diego, CA, US  
Tacoma, WA, US  
Honolulu, HI, US  
Charleston, SC, US  
Beaumont, TX, US  
Bremerhaven, DE  
Diego Garcia, GB  
MM2





# Priorities

## Production:

- 292 DVH (Sep/Oct Award)
- NBCRV FRP in Dec (168 additional)

## Fielding:

- DVH (ongoing)
- 8<sup>th</sup> BDE (FY12)
- 9<sup>th</sup> BDE (FY13)

## Sustainment:

- Blue to Green
- Reset (OEF vehicles @ ANAD, FY12)
- BDAR (ongoing @ ANAD / Qatar)

## Upgrade:

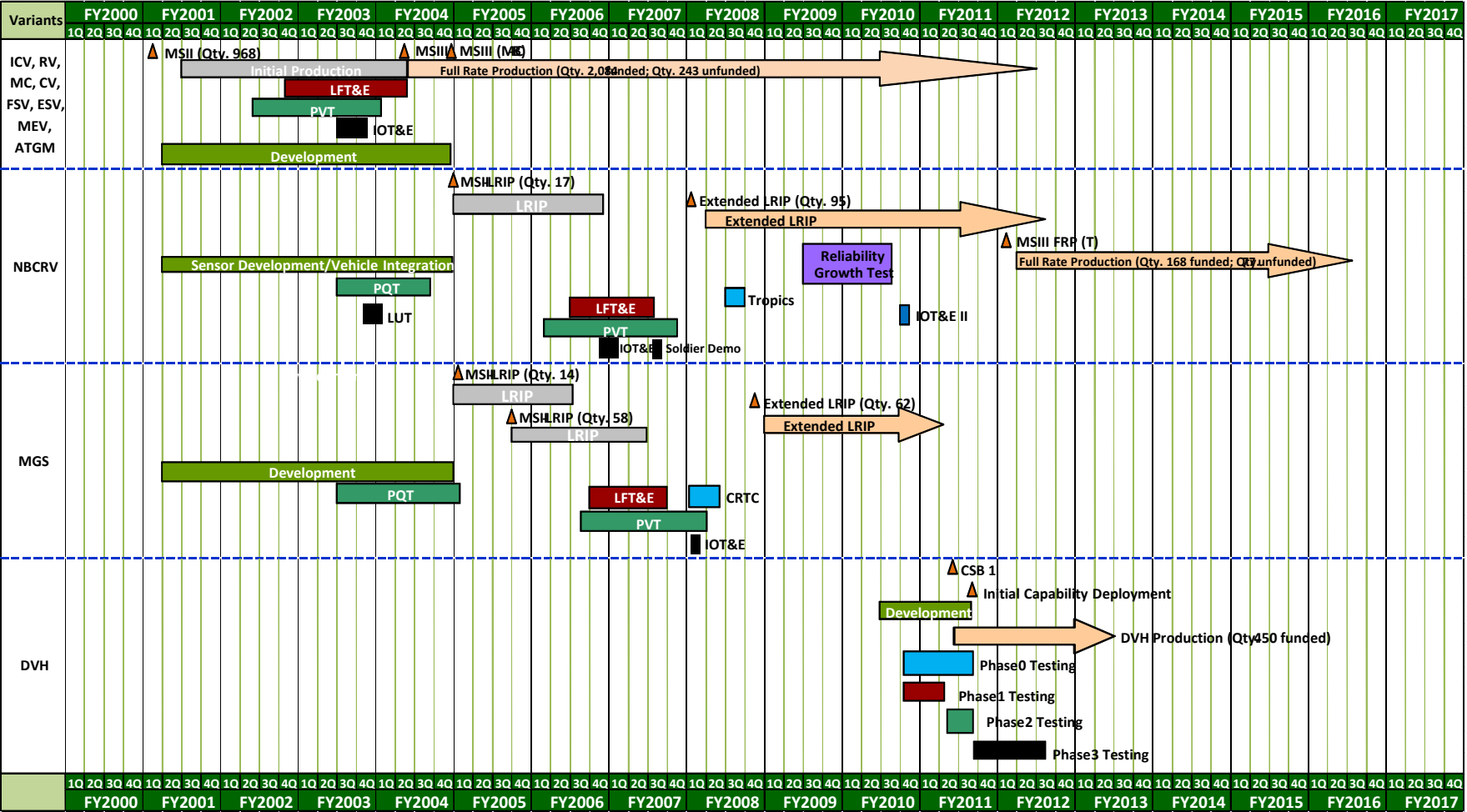
- ECP (Network) in process
- Recap (planning in process)



OUR MISSION IS OUR WARFIGHTERS' FUTURE



# Stryker Program Schedule



OUR MISSION IS OUR WARFIGHTERS' FUTURE



# Stryker Transition to Organic Maintenance Support

## Supply Support

- Garrison units transition in the beginning of FY12
- Parts flow through AWCF after transition

## Maintenance Support

- Brigades began transitioning in FY08
- Production-8 variants will complete transition to organic unscheduled support in FY12
- MGS and NBCRV will retain unscheduled service support
- In SBCTs/HBCTs:
  - MGS TBD
  - NBCRV until 94F are trained, target FY13
- In Chemical Companies:
  - Until an MTOE change adds 94F to chemical companies
- Units retain 4 FSR / BDE post transition, retaining CLS mechanics for scheduled services

| Unit     | FY08 | FY09 | FY10 | FY11 | FY12 | FY13 | FY14 | FY15 | FY16 | FY17 | FY18 | FY19 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| SBCT 1   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 2   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 3   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 4   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 5   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 6   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 7   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 8   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| SBCT 9   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| TRADOC   | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| OCR      | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| DRCF     | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| HBCTs    | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |
| Chem Cos | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue | Blue |

CLS for ALL Variants

MGS and/or  
NBCRV CLS

Organic/Ktr  
Hybrid

OUR MISSION IS OUR WARFIGHTERS' FUTURE





# Stryker Opportunities for Industry and Challenges

- Industry Potential:
  - GDLS Supplier/Sub-Contractor
  - Weight Reduction/Saving Alternatives
  - Production of A-kits (mounting/attachment hardware) for DVH kits
  - Survivability kit refurbishment (e.g., platt swing mounts)
  - Packaging for selected assemblies (e.g., suspension items)
  - Facilities maintenance/other logistics support for Stryker facilities in US and Qatar
  - Recurring Stryker Unique Sustainment Item Procurements (e.g. kits, brackets, metal plating, and cables)
- Communications and Net Readiness:
- C2 Technologies, Smart Display Commonality, Modular Intra –Vehicle Network
  - Situational Awareness: Out of Hatch capabilities, Video recording, 360 SA
- Integrate C4ISR Systems into Stryker Platforms- Technology Capability Integration Solutions
  - Compliance with Net-centric Operations and Warfare Standards
  - IDE (Integrated Digital Environment) -
    - The IDE is an integral part of Stryker becoming part of the Army Net-Centric Data enterprise. IDE will be implemented using ANCDs technologies and architectures.
  - Robust Network Capability (voice – data – video) enabling communications for line of sight or beyond line of sight
  - Execute Tactical Network Operations to expand and extend transport network based on operational needs
- Supportability:
  - Continuous/cost-saving Improvement to support the FOV



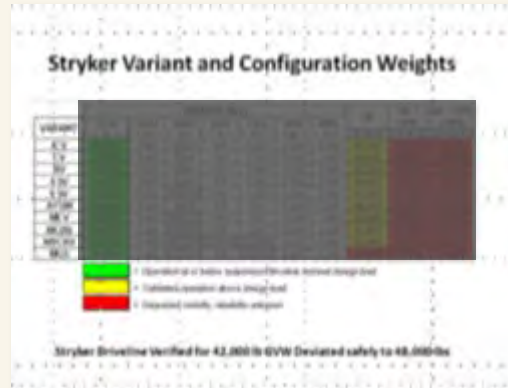
# The Need to Upgrade

## SPACE



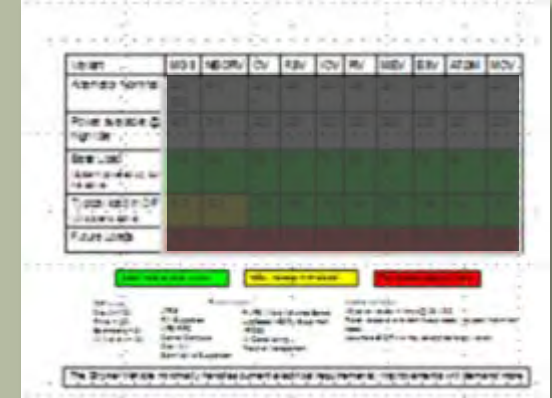
- Multiple Appliqué solutions added; "Scaleable / Kitable Concept" limited
- Kits create both interior & exterior challenges for each carrier variant
  - CREW, GSS/MSS, Armor Upgrades
  - Additional displays/screens
  - 2<sup>nd</sup>/3<sup>rd</sup> order effects include weight and power

## WEIGHT



- Kits required to address threats
  - IED, RPG, EFP, Sniper, etc
- Only select Kits can be applied
- Deployed configuration weighs more than planned
- Limit Mobility

## POWER



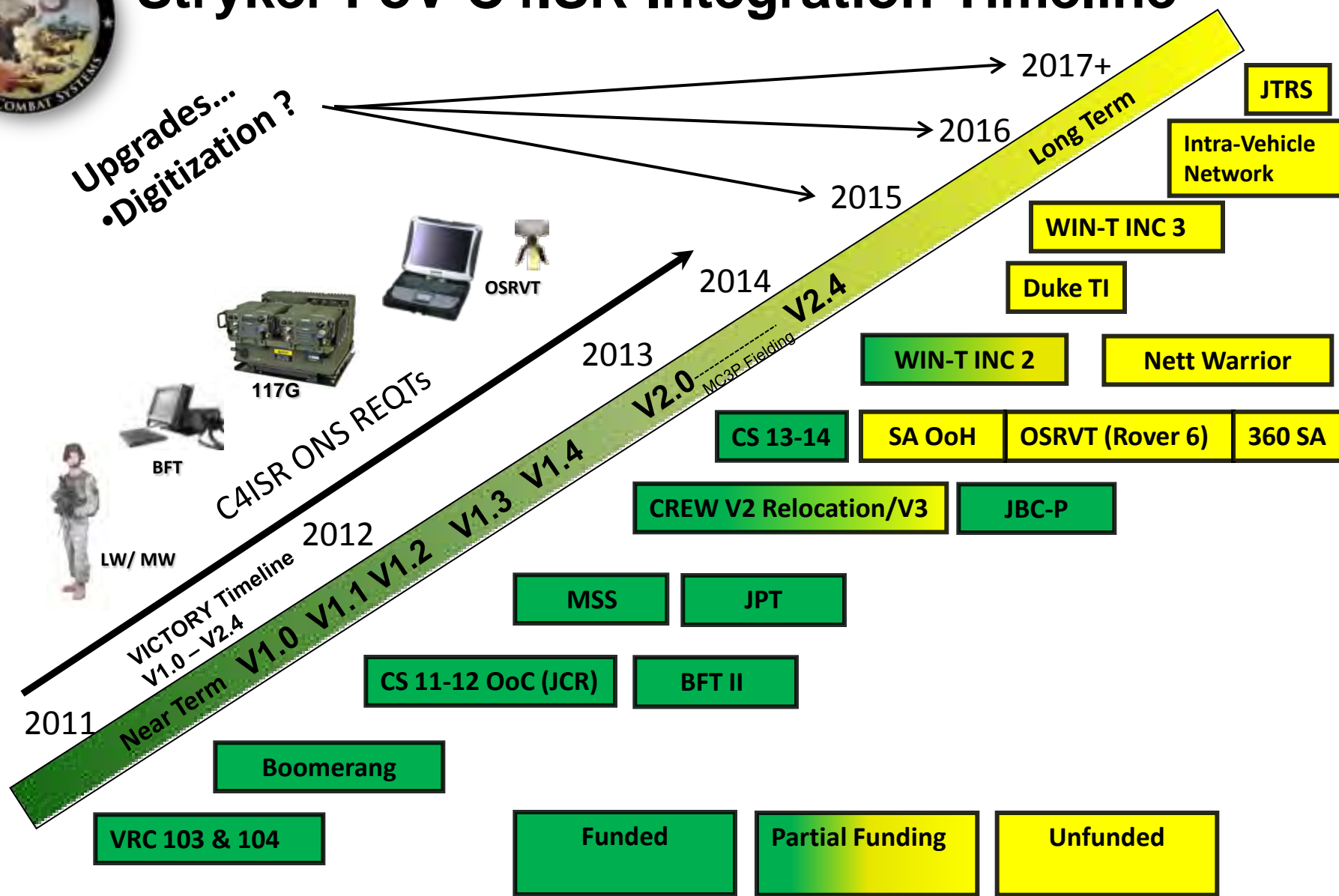
- OIF kit loads require some systems to be turned off
- Current Power Generation cannot meet expected future loads
- Silent watch capability impacted
- Excess heat impacts both onboard electronics and Soldier's effectiveness

**Current Space, Weight, and Power Capacity Shortfalls require Upgrades to Stryker FoV**

OUR MISSION IS OUR WARFIGHTERS' FUTURE



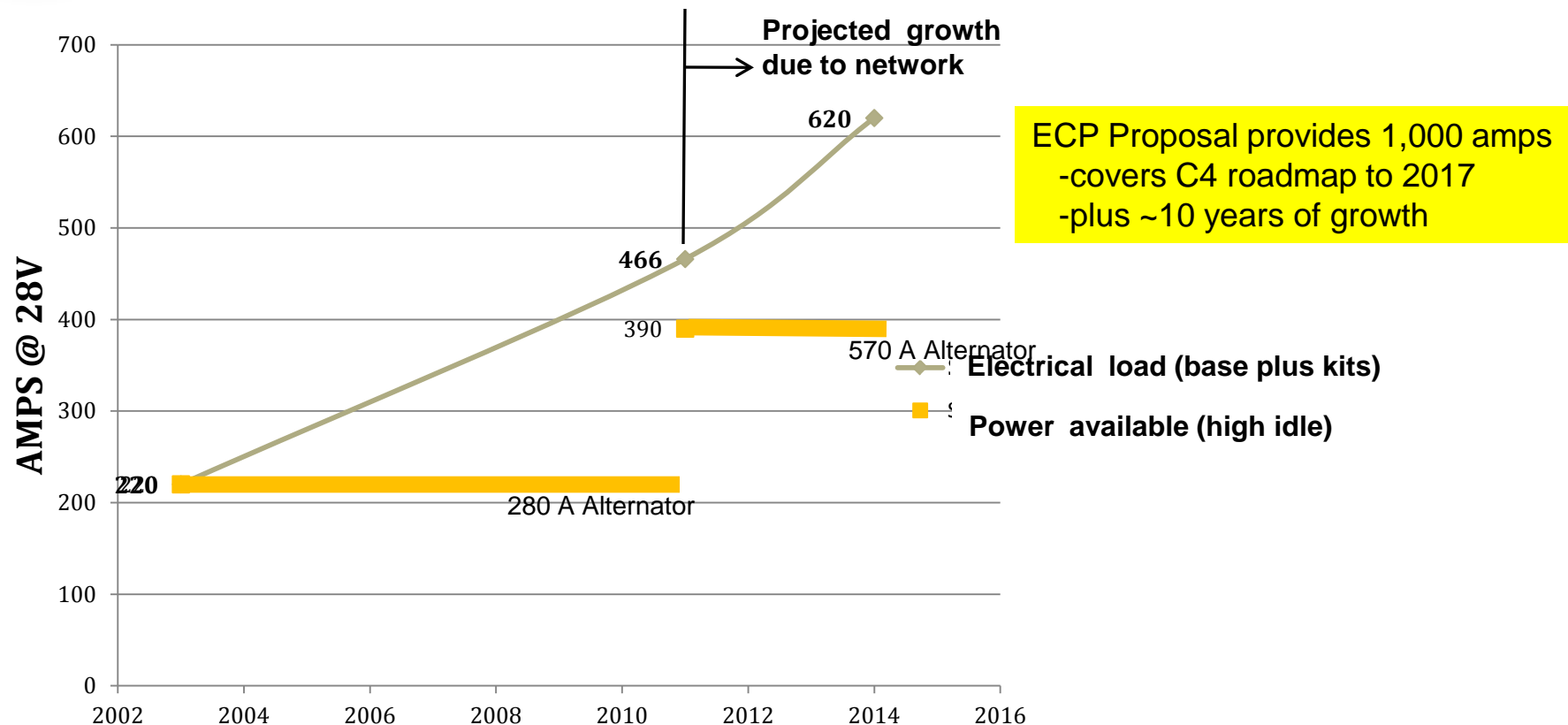
# Stryker FoV C4ISR Integration Timeline



OUR MISSION IS OUR WARFIGHTERS' FUTURE



# Stryker Power Demand Growth over 10 years (CV)



- Power demand has grown ~30 amps per year since program inception.
- Current C4 roadmap projections are on track to increase that historical rate.
- Stryker CV already cannot power all installed systems at the same time.

OUR MISSION IS OUR WARFIGHTERS' FUTURE





# Potential Stryker ECP Technologies

## ● GAP: Network Enabled/Protection

### • Electrical System

- Increase electrical power
- Battery and Power management

## ● GAP: Protection

- Increased IED/Mine protection (e.g. DVH)
- Energy Attenuating seats

## ● GAP: Network Enabled

- Integrated C4 upgrade
- Centralized processing with data and video networks
- MILS network
- GSS/MSS integration
- Multi-functional Displays
- Enhanced embedded training

## ● GAP: Mobility

### • Suspension

- 60K w/semi-active suspension
- Improved Mobility

## ● GAP: Mobility/Protection

### • Power Train Upgrade

- 450HP engine
- Heating/Cooling System
- Parking Brake



## ● GAP: Lethality/Protection

### • RWS Upgrades

- Javelin
- Far target/slew to cue

### • 360 SA

### • Gunshot detection

## ● GAP: Lethality/Protection

### MGS Long Term Deficiencies

- Color day sight/display
- Reduced trigger delay/gun tube stabilization
- Under armor 50 cal
- Improved 105MM ammo protection



Potential ECP Technologies

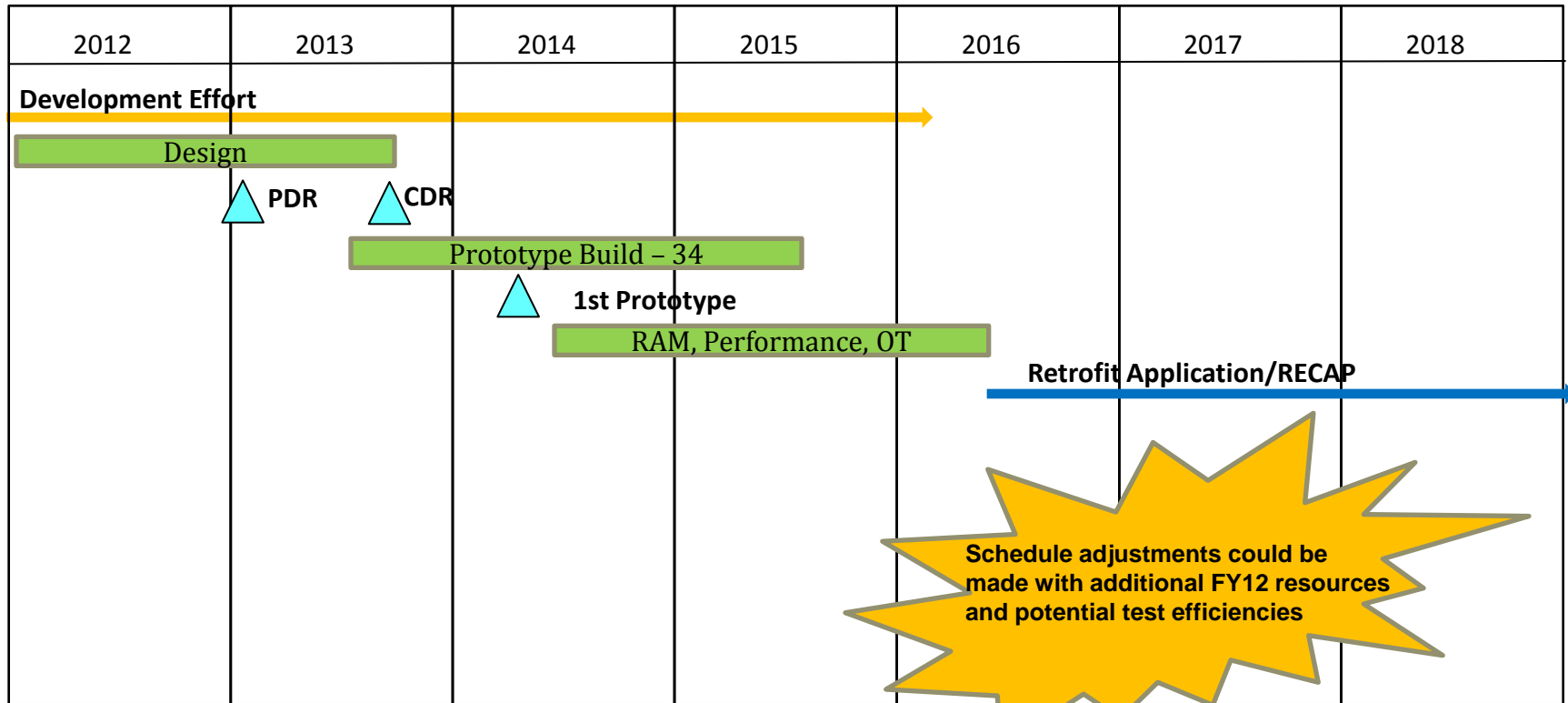


Not being pursued under ECPs

OUR MISSION IS OUR WARFIGHTERS' FUTURE



# A Notional ECP COA



- Notional schedule above implies a January 2012 start date--decision on size/scope of ECP unlikely before spring of 2012



OUR MISSION IS OUR WARFIGHTERS' FUTURE

Distribution Statement A: Approved for public release; distribution is unlimited





# Combat Vehicle Conference 24-26 October 2011



**Dr. David Gorsich**  
**Chief Scientist**

U.S Army tank Automotive Research, Development and Engineering Center (TARDEC)





# TARDEC Mission





# The Arsenal of Democracy

- Connected to World-Class Automotive Engineering Universities at our Doorstep
- Defense Industry Ground Systems Hub
- Direct Linkage to World-Class Automotive Research and Development Centers
- Strategic Engagement with 1st, 2nd & 3rd Tier Automotive Supplier Network



MichiganTech

CMU

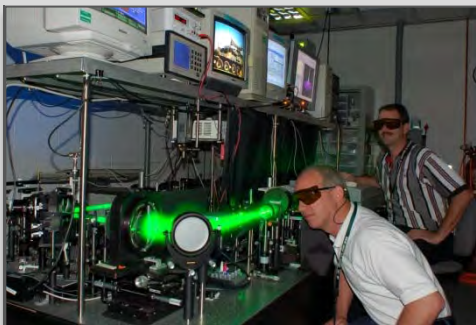


Detroit Arsenal





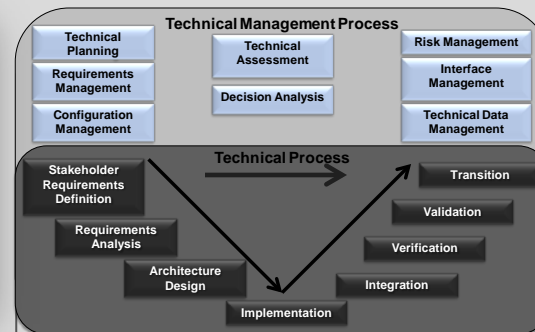
# Capabilities



**Research**



**Technology Development**



**Systems Engineering**

**Integration**



**Production Support**



**Field Support**





## Key Technical Thrust Areas

- Ground System Survivability
- Vehicle Electronic Architectures
- Ground Vehicle Robotics and Intelligent Systems
- Ground Systems Power, Energy and Mobility
- Force Projection Technology; Alternative Fuels, Lubricants and Water Purification

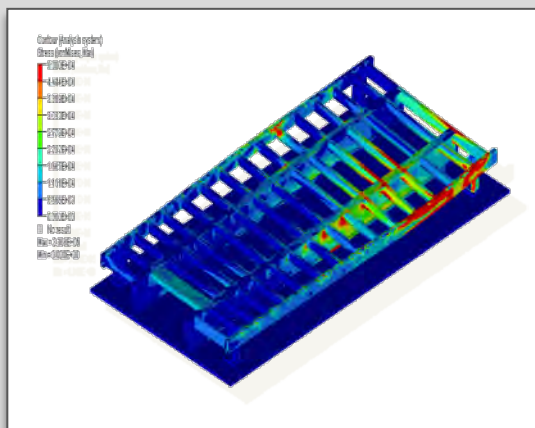






## Laboratory Capabilities

- Ground Systems Power and Energy Laboratory (GSPEL)
- Advanced Concepts Laboratory
- Advanced Collaborative Environments (ACE)
- Laser Protection Laboratory
- Armor Nondestructive Testing Laboratory
- Robotics Systems Integration Laboratory
- Ground Vehicle Systems Integration Laboratory
- GVR Robotic Laboratories
- Electronics Integration
- Physical Prototyping
- Design & Digital Mock-up
- Metallurgy Test Laboratory
- Survivable Structures Laboratory
- Ground Vehicle Power & Mobility Elastomer Improvement Laboratory
- Ground Vehicle Power & Mobility Propulsion Laboratory
- Physical Simulation Laboratory
- Analytical Simulation Laboratory
- TARDEC Simulation Labs
- Survivability Armor Ballistic Laboratory (SABL)
- Fuels & Lubricants Laboratories
- Water Purification, oil, fuels and lubricants Laboratory
- Fresh Water Test Facility
- NFESC Seawater Test Facility
- Dynamic Structural Load Simulation Lab



**TARDEC's Warren, MI operations have a resource value of over \$1.1B and occupy 12 facilities on the Detroit Garrison totaling over 936,000 square feet of laboratory space**



# Army Technical Challenge

## More Mobile, Fuel Efficient, Safer Vehicles

### Mobility & Energy Efficiency



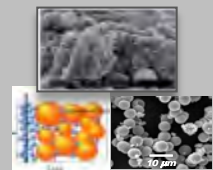
#### Vehicle Dynamics

Newton-Euler Equations of Motion

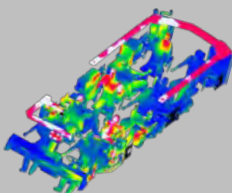
$$\begin{cases} M\ddot{q} + C_q^T \dot{q} = Q_e \\ C(q, \dot{q}) = 0 \end{cases}$$

Solve for vehicle mobility and component loads

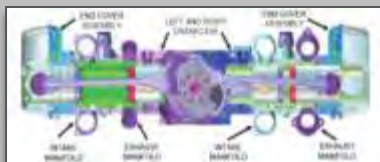
$$\begin{bmatrix} M & C_q^T \\ C_q & 0 \end{bmatrix} \begin{bmatrix} \ddot{q} \\ \lambda \end{bmatrix} = \begin{bmatrix} Q_e + Q_d \\ Q_d \end{bmatrix}$$



Hi-Energy,  
Hi-Density  
Energy  
Storage



Comprehensive  
Thermal Management  
of Propulsion & Cabin



High Power Density,  
Low Heat Rejection &  
Fuel Efficient Engines

### Occupant Centric Survivability

Active  
Protection  
Systems

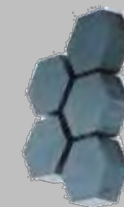


Holistic Occupant  
Centric Protection

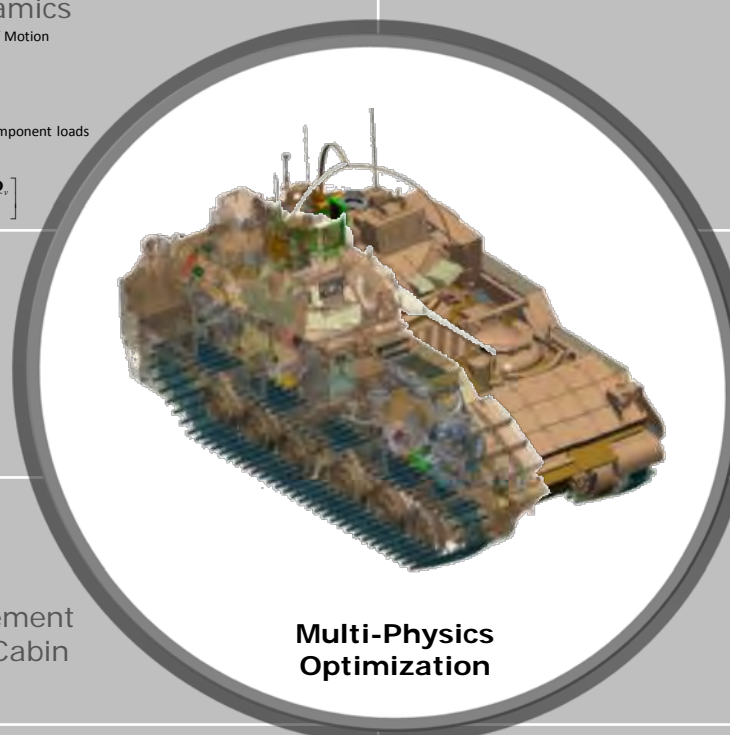
$$\frac{d}{dt} \int_{V_t} f(x, t) dV = \int_{V_t=V_t} \frac{\partial f(x, t)}{\partial t} dV + \int_{S_t=S_t} f(x, t) \cdot n dS$$



Affordable, Multi-  
hit Ceramic Armor



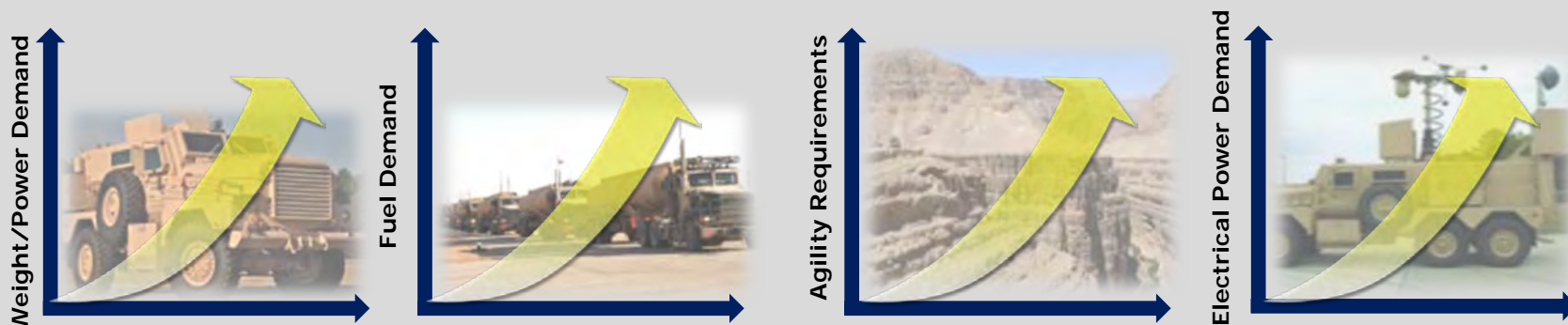
Fire and Toxic  
Fume Resistant  
Materials



Multi-Physics  
Optimization



# Ground Systems Power, Energy and Mobility



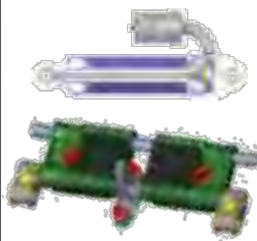
Increasing Demands and Operational Flexibility  
Require Strategic Investments in Key Areas



**Powertrain**



**Thermal  
Management**



**Track &  
Suspension**



**Non-Primary  
Power**



**Energy  
Storage**

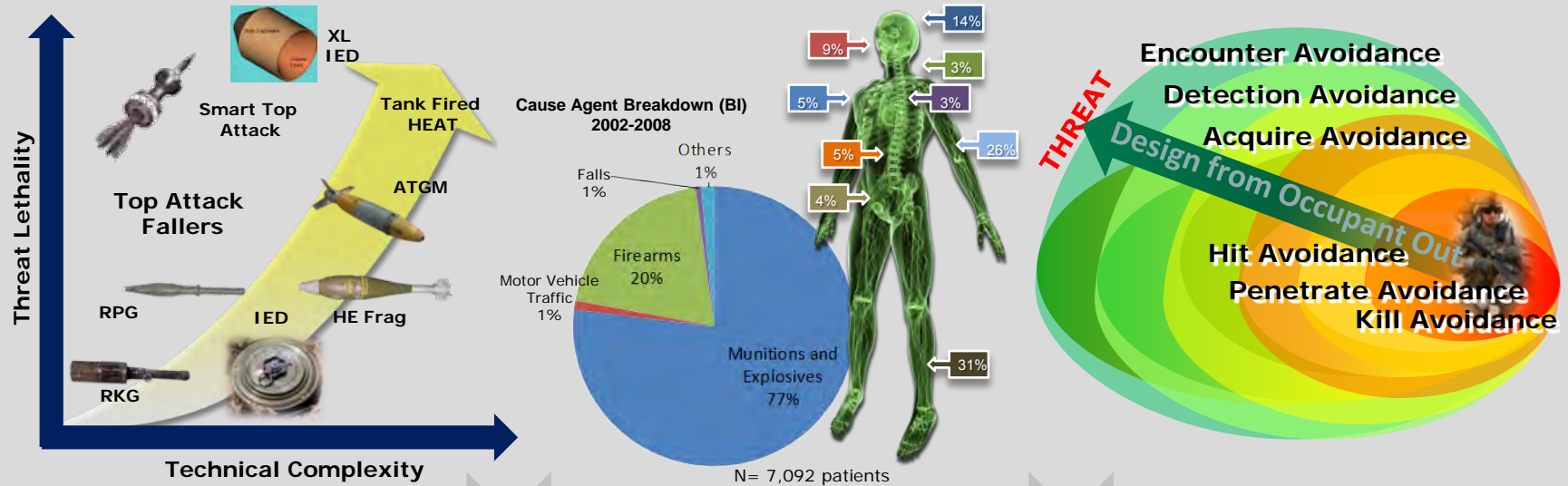


**Advanced  
Propulsion**





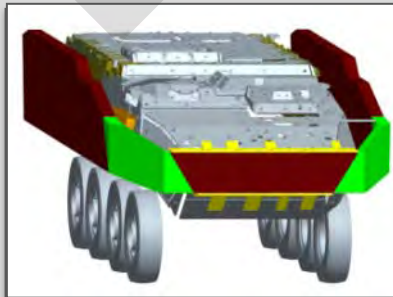
# Occupant Centric Survivability



Increasing Demands and Operational Flexibility  
Require Strategic Investments in Key Areas



Kill Avoidance



Penetration Avoidance



Hit Avoidance

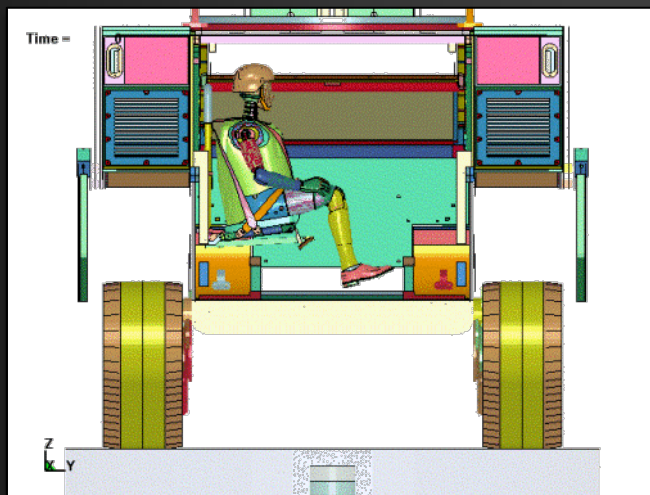


Detection Avoidance



# Underbody Blast

## End-to-End Underbody Blast Simulation



**Advanced full vehicle, system level design tools are key enablers to:**

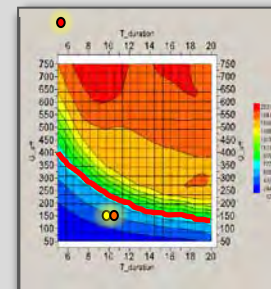
- Assessing Occupant Injury Risk
- Developing new protection technologies
- Improving force vehicles for current threats
- Designing new occupant-centric vehicles



**Energetic Event  
(UB Blast)**



**Component &  
Platform Interaction**



**Occupant Injury  
Response**



**System  
Evaluation**



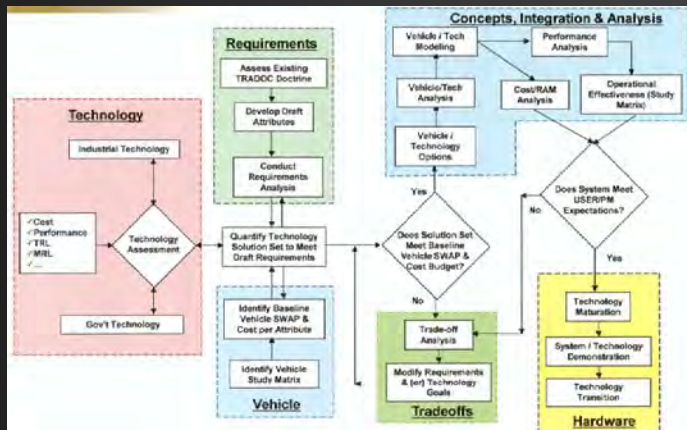
**Design Improvement  
& Optimization**



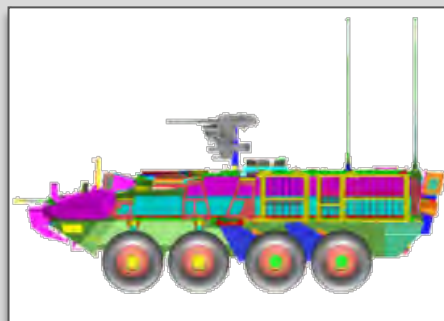


# Technology Integration & Engineering

## Integration Services:



- Advanced Concepts Modeling
- Physics Based Analysis
- Statistics based analysis in Man-in-the loop simulation
- Integrated System Level Demonstrators and Prototypes
- High Performance Computing & Data Management





# Reducing the Fuel Logistics Burden



**1 in 46**  
convoys suffered a  
casualty in 2010, leaving  
some 3,000 wounded or  
dead

A **1%** fuel  
savings will lead to

**6444**  
fewer Soldier trips in  
dangerous battlefield  
convoys

*Modeling and Simulation:  
Optimize the System*



*Research and Testing*



*Demonstrate Systems  
and Technologies*



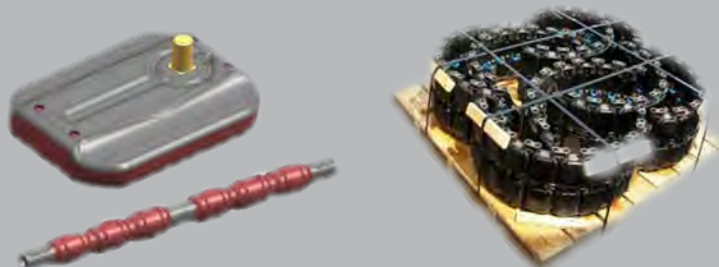


# Reducing the Track Logistics Burden

Abrams T-158LL Track  
Bradley T-157I Track



Track System Research



- Track Systems are the 2<sup>nd</sup> Highest Operation & Sustainment (O&S) Costs
- Abrams T-158LL Track Life is -2,200 miles
- Bradley T-157i Track Life is - 3,000 miles
- Elastomer Components are the primary failure mechanisms for track systems





U.S. ARMY  
**RDECOM**  
Research, Development, Engineering, Construction



# Reducing the Battery Logistics Burden

**AGM Battery Failures  
2002-2008**

**~250,000**

**Incorrect Voltage Output**



**50%**

**Damaged - Transport Issues**



**30%**

**Improper Electrical Performance**



**20%**

**Approximately 80% of incorrect  
voltage failures were serviceable**

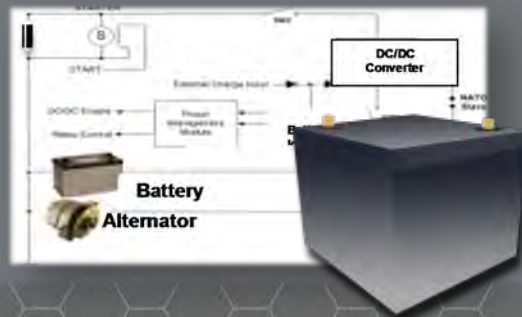
**Improved charging techniques  
can lead to 2X life improvement**



## Field Battery Maintenance & Training



## Improved Charging



## Battery Management



- Annual Purchase of Vehicle Batteries: 700,000
- \*\*AGM = Advanced Glass Mat.: "maintenance free"



# Current Projects



**Light Armored Vehicle-Recovery (LAV-R)**



**Paladin Integrated Management (PIM) Air Grills**



**Stryker Command and Control on the Move (C2OTM)**



**RPG Defeat Net**





# Contact Us

## Doing Business with TARDEC

Ground Vehicle Gateway - Windows Internet Explorer

https://groundvehiclegateway.com

File Edit View Favorites Tools Help

Ground Vehicle Gateway

**TARDEC** **RDECOM** **U.S. ARMY**

**GROUND VEHICLE GATEWAY**  
U.S. ARMY TANK AUTOMOTIVE RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

**TARDEC Technology Submissions**

Soldiers are our NUMBER 1 priority. Help us make them your priority as well. Submit your ground vehicle systems technology concepts, ideas and innovations to TARDEC today using the electronic submission form below. Your submission will be treated confidentially, and a TARDEC technologist will thoroughly evaluate your proposal.

For all other inquiries, click on this link: <http://tardec.army.mil/contact.asp>

**Your Submission**

Submission Title:

Submission:

Documents:  Browse

Browse

Browse

Browse

Click "Browse" and select the file you want to attach.  
\*Using the button in the field group will not attach your data.

Business Name:

Industry:

Name:

Job Title:

Address 1:



## TARDEC's Ground Vehicle Gateway is YOUR entry point!

Submit your technology for review  
<https://tardec.groundvehiclegateway.com>

Dr. David Gorsich  
[david.j.gorsich.civ@mail.mil](mailto:david.j.gorsich.civ@mail.mil)





# BACK UP



# The Logistics – Technology Paradigm

## The Two Facets of Future Capabilities through the Logistics Lens



Look at  
**Innovative ways to  
Reduce Logistics Burdens**

Unburden the  
Warfighter

Look to  
**Design Good Logistics In  
From Start**

Reduce  
Unintended  
Consequences

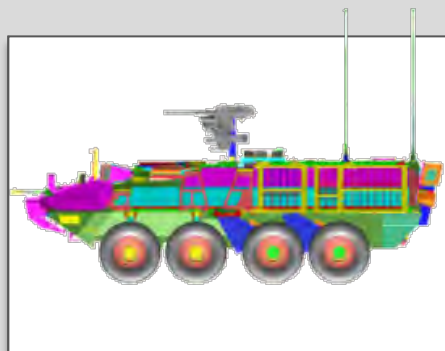


# Technology Integration & Engineering

## Integration Services:



- Advanced Concepts Modeling
- Physics Based Analysis
- Statistical-based Hardware & Man-in-the-Loop Simulation
- Integrated System Level Demonstrators and Prototypes
- High Performance Computing & Data Management







# **Company D 1st Tank Battalion OEF 2011**



Unclassified



# AGENDA



- Overview
- AO Map
- Task Organization
- Modifications
- Command & Control
- Operations
- Logistics/Equipment
- Force Protection
- Questions



Unclassified





# Area of Operations





# DELTA COMPANY TASK ORGANIZATION



Delta Company

Combat Trains  
Including  
1 M88

1st Platoon  
4 M1A1 Tanks  
1 M88

2nd Platoon  
4 M1A1 Tanks

3rd Platoon  
4 M1A1 Tanks  
1 M88

HQ/Scouts  
2 M1A1 Tanks  
1 MRAP  
3 MATV's







# MODIFICATIONS



- MP-HE Round
- Belly Armor Kit
- Improved Drivers Seat
- CVRJ
- BFT
- Crew Cooling Systems
- Coax brass bag
- Blade/Plow
- FO/FAC Kits



Unclassified



# COMMAND & CONTROL



- Delta Company attached to Regimental Combat Team 8.
- Delta Company (-) was in direct support (DS) of BLT 3/8 then V3/4.
- The company established a CLOC co-located with the infantry battalion to monitor MIRC, BFT, SIPR, NIPR, VOSIP and VOIP.
- FWD command was configured with BFT and HPW capabilities.



Unclassified





# OPERATIONS



- HQs/Scouts were employed at the Battalion Commander's discretion to conduct disruption and recon missions.
- The tank platoons conducted SBF, Attack by Fire, clearing, disrupting, interdicting, counter – IED, route security patrols, mechanical breaching, BP/Force Protection and limited route clearance.
- Most engagements occurred at 1000 to 3800 meters . Most engagements occurred when insurgents maneuvered on and engaged Marine dismounted patrols.



Unclassified



# OPERATIONS



- Multiple attempts to engage tanks with mortars or 82mm recoilless rifles fired in indirect fire mode.
- Very few attempts to engage tanks with RPGs, machine gun or small arms fire.
- Adverse terrain did not affect the mobility or maneuverability of the tank.
- The tank was the only platform in country that was not restricted to established routes or flat and open terrain.
- Tanks operated successfully with belly armor in the heavily vegetated green zone that skirts both banks of the Helmand River.
- Tanks were successfully used on a consistent basis to recover MRAP's and MATV's that had become mired in weather compromised terrain.



Unclassified





# LOGISTICS/EQUIPMENT



- T/O and T/E met all requirements placed on the company throughout the deployment.
- Parts failure rates were similar to those experienced in CONUS.
- All logistical support was “pushed” by the tank company combat trains to the tanks in the battle space.
- Majority of maintenance was conducted while the tanks were still operating in the battle space.



Unclassified



# FORCE PROTECTION



- Tanks were normally employed with some form of infantry support.
- The IED is still the largest threat to any mounted element in Afghanistan.
- The ambush and direct fire threat to a tanks is insignificant.



Unclassified





Questions???



# MAJ Jim Ianitelli

## Assistant Product Manager

### JERRV / Systems Integration



#### AMS Mission:

Detect, mark, identify, interrogate, classify, and neutralize suspected explosive hazards, including improvised explosive devices.





# Deployment Experience



- **OEF IV – Platoon Leader & Company XO, Bravo Company, 41<sup>st</sup> Engineer Battalion, Fort Drum, NY**
  - Conducted Area and Route Clearance Operations
- **OIF V – Maneuver Advisor – Border Transition Team 4313**
  - Operations Officer for a Border Transition Team mentoring Iraqi Border Police along the Iranian Border
- **OEF X – 4-4 IBCT, HHC BDE Company & Alpha Company, 4BSTB, 4ID Company Commander**
  - HHC CDR for Task Force Mountain Warrior at Jalalabad Air Field, AF
  - Combat Engineer Company Commander – Land Owner, Maneuver Unit, FOB Commander



# Thank You

**OEF IV – Aug 03**



**Beast 36**

**OIF IV – May 07**



**Gatekeeper 3**

**OEF X – Apr 10**



**Assassin 6**



# OEF IV

- Area and RTE Clearance
- First RCVs in OEF Pictured
- COTS vehicles; importance of these vehicles and their mission quickly realized
- Lots of VIP visits





# OIF IV





# OEF X







# OEF X Cont.



- Vehicles continue to receive survivability upgrades throughout our deployment





# War Story – Taliban CP

- **Intent: Just tell it how it is...**
- **Not going to give suggestions just want to make everyone think.**
- **Mission First – With all the equipment we currently have and are currently developing, one must always remember that there is a mission that needs to be accomplished first and foremost.**
- **Focus on educating Leaders and limitations of your system.**
- **Our mission during OEF was governance and development.**
- **Our FOB AO included three districts in Nangarhar Province.**





# War Story – Taliban CP Cont.



- **Mission: ANA, with support from 2<sup>nd</sup> Platoon, A Co, conducts COIN operations in the vicinity of illegal Taliban CP.**
  - Taliban would react to FOB RIAB (Radio In A Box) messages by smashing locals radios, robbing locals, act of intimidation. RIAB messages would:
    - Promote local government, ANSF, Coalition support
      - Messages from District Sub-governors, ANSF Leadership to include Army, Police, Boarder Police and Customs Leadership.
    - News – Local and World current events
    - Discredit Taliban and their activities
    - ANA Mullah broadcasts along with Call-to-Prayer broadcasts
    - Call in shows for local residences
    - Educational Broadcasts (ex. The long term affects of Poppy Farming)
  - ANA with local police show presence
  - Distribute 200 radios to local citizens
  - Distribute 500 pens with FOB call in number

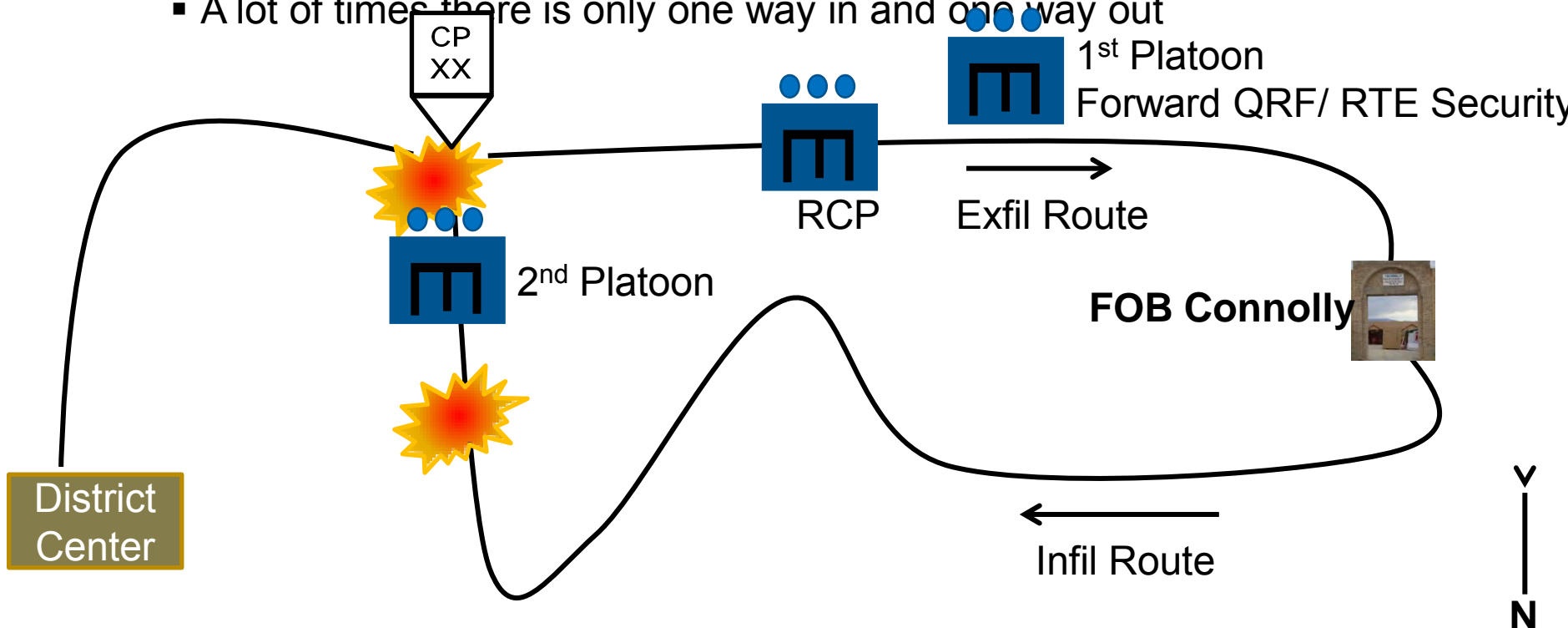


# War Story – Taliban CP

- **Alternate route utilized to get to Taliban CP, 2<sup>nd</sup> Plt is ambushed.**

- Route Clearance not utilized for infil but used for exfil
- Ranger School tactics vs. Real World limitations

- A lot of times there is only one way in and one way out





# 2<sup>nd</sup> Platoon is Ambushed While Heading to CP 515

## Inside an RG-31 during an Ambush



# The U.S. Army Stryker Brigade Combat Team



SGM Brandon Jenks TCM-SBCT Sergeant Major, Ft. Benning, GA.  
25 October 2011





# Agenda

- Stryker characteristics and capabilities
- SBCTs flexibility
- Stryker performance in Afghanistan
- Successes in OEF
  - Increased SA
  - Casualty Evacuation
  - MGS
- Challenges in OEF
  - IEDs and training
  - Mine Detectors
  - Vehicle Recovery
- True strength of an SBCT
- Questions / Discussion







# SBCT Capabilities and Characteristics

- Very, very good truck!
- Eight wheeled armor vehicle
- Carries a 3 man crew, and 9 man infantry squad
- Travels up to 70 MPH
- Strategic, operational & tactical mobility
- Superior Infantry carrier vehicle
- Armed with an Remote Weapons Station (RWS)
- .50 Cal Machine gun and/or MK-19 40 MM Grenade launcher





# Stryker

UNCLASSIFIED

4



UNCLASSIFIED



# Stryker

UNCLASSIFIED

5



UNCLASSIFIED





# Afghanistan

UNCLASSIFIED

6



UNCLASSIFIED



# The U.S. Army Stryker Brigade Combat Team







# The U.S. Army Stryker Brigade Combat Team

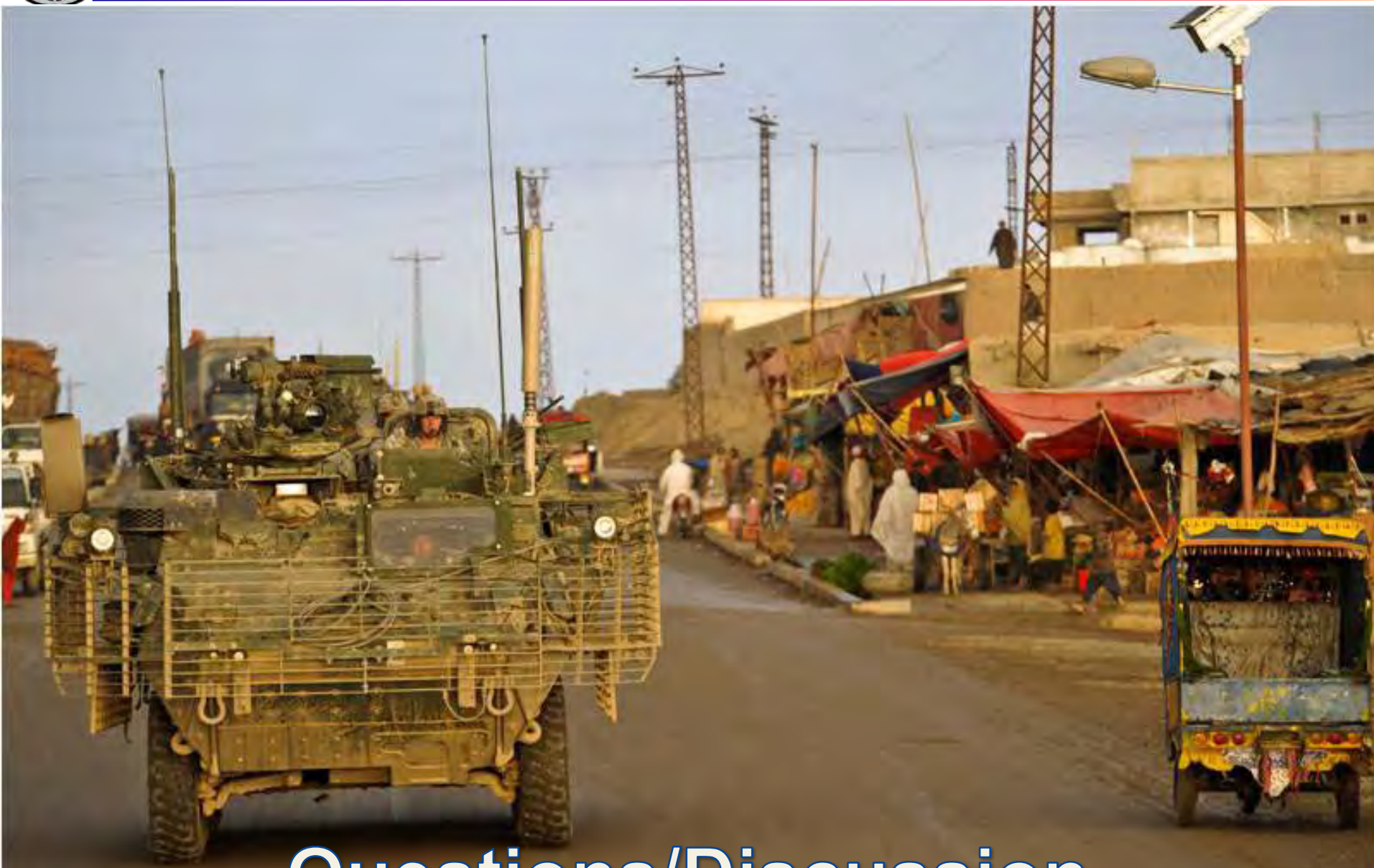
## AMERICA'S FINEST







# The Stryker Brigade Combat Team



## Questions/Discussion





# TCM-SBCT Contact information

**SGM BRANDON T. JENKS**

**Sergeant Major for TRADOC Capability Manager, Stryker Brigade Combat Teams**

**35 Ridgway Loop, Room 101  
Fort Benning, GA. 31905**

**Email – [brandon.t.jenks.mil@mail.mil](mailto:brandon.t.jenks.mil@mail.mil)**

**Office: 706-545-1332**

**Cell : 706-604-4360**

**Fax: 706-545-5355**





**MARINE CORPS SYSTEMS COMMAND**

***EQUIPPING THE WARFIGHTER TO WIN***



LAV-25  
1984-2003

LAV-25 A2  
2007-2025



# USMC FOLAV Overview

## NDIA 2011 Combat Vehicles Conference

Dearborn, Michigan

25 Oct 2011

**Major Henry Kayser, USMC**  
Operations Officer, Light Armored Vehicles

"This presentation contains reference to the United States Government military capabilities that may not be authorized for release or sale to other countries. Mention of these capabilities in no way implies that the United States Government will release or consider release of them or any associated classified or unclassified information pertaining to them."

***PM LAV...Global Vision - Global Mission***

Information Current as of 11 Oct 2011





## Agenda

- ✦ Overview of PM LAV
- ✦ LAV-C2 Upgrade Program
- ✦ LAV-AT Modernization Program
- ✦ LAV-R Upgrade Project
- ✦ Survivability II Project (SURV II)
- ✦ Survivability III Program (SURV III)
- ✦ Electrical Upgrade
- ✦ LAV Indirect Fire Modernization Program
- ✦ LAV Sustainment Efforts
- ✦ Industry Opportunities
- ✦ Conclusion



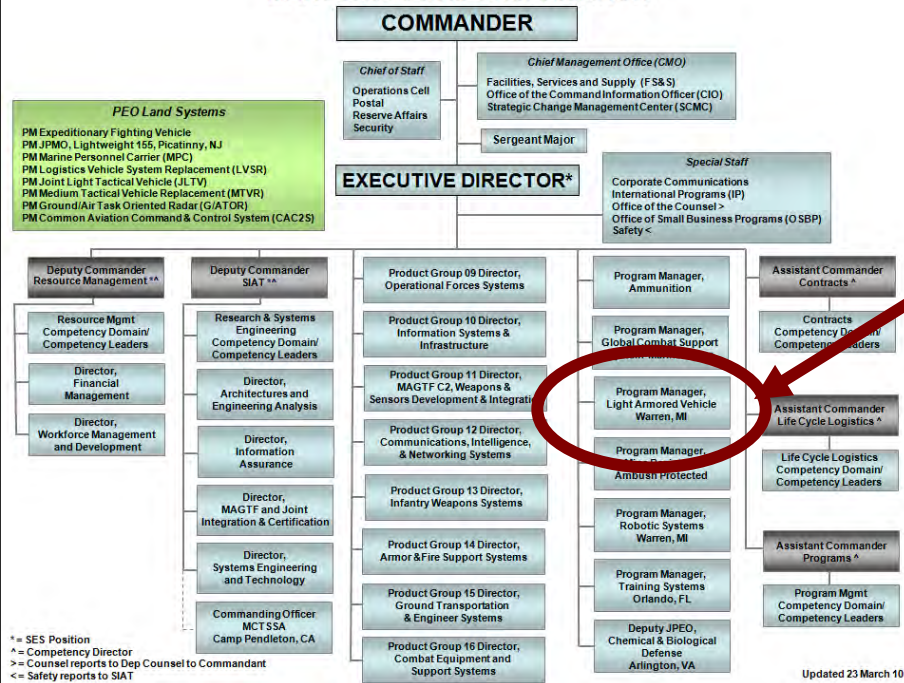
# MARINE CORPS SYSTEMS COMMAND

EQUIPPING THE WARFIGHTER TO WIN



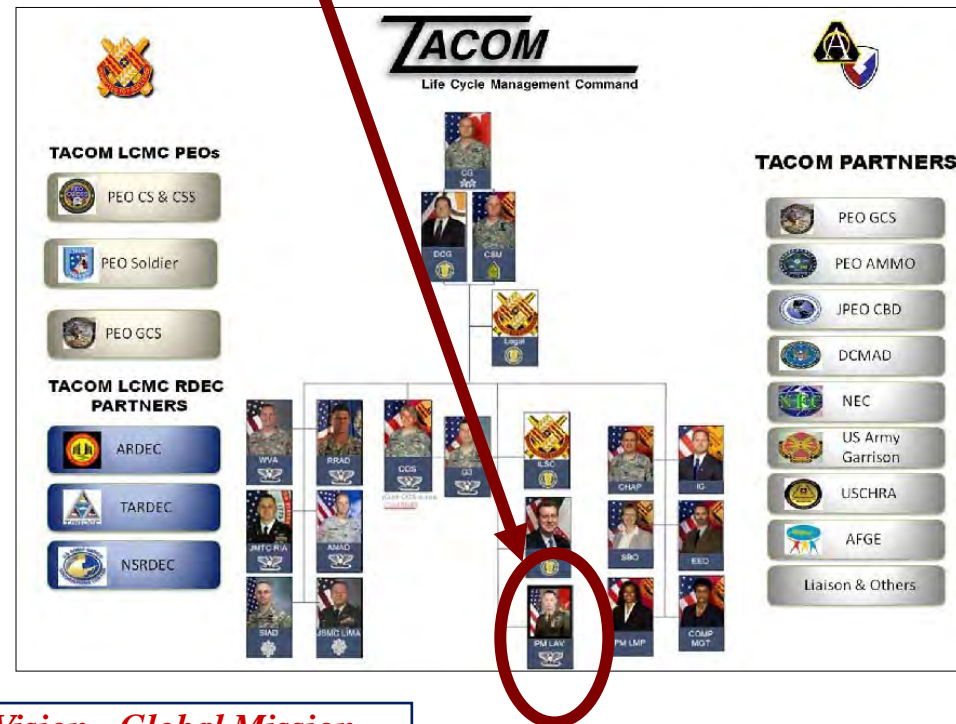
## A Unique Organization

### MARCORSSYSCOM ORGANIZATION



A MCSC Program Office Located at the Army's TACOM Life Cycle Management Command Staffed with Marines and Army Acquisition and Sustainment Professionals

PM LAV represents MCSC interests within the TACOM LCMC. The PM/DPM has membership on the LCMC Board of Directors and the LCMC Real Property Planning Board



PM LAV..Global Vision - Global Mission



**MARINE CORPS SYSTEMS COMMAND**

**EQUIPPING THE WARFIGHTER TO WIN**



## With Defined Guidance

### *VISION*

For the LAV Team to Achieve World Class Leadership in Innovative Systems *ACQUISITION* and Effective *SUSTAINMENT* of Armored Vehicles

### *MISSION*

Provide Technologically Superior Weapon Systems While Supplying *FOCUSED LIFE CYCLE MANAGEMENT* to Our Customers through Research, Development, Acquisition, and Life Cycle Support of Light Armored Vehicle Systems.

### *VALUES*

#### *CUSTOMER SATISFACTION*

Professionalism

Integrity

Honesty

Teamwork



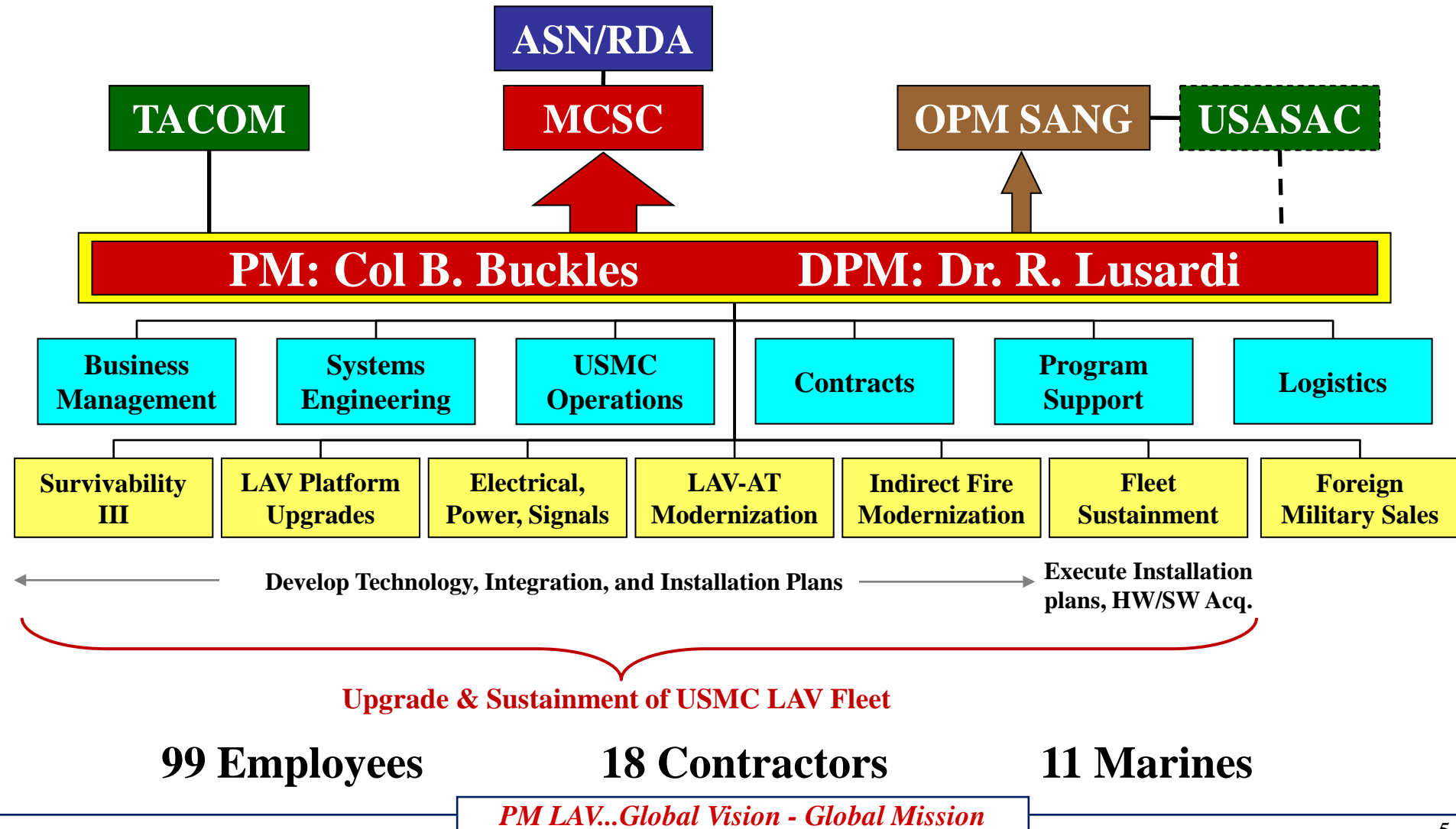


**MARINE CORPS SYSTEMS COMMAND**

**EQUIPPING THE WARFIGHTER TO WIN**



# PM-LAV Table of Organization





**MARINE CORPS SYSTEMS COMMAND**

**EQUIPPING THE WARFIGHTER TO WIN**



## PM-LAV Programs

- ✦ PM-LAV Mission - Research, development, acquisition and life cycle support for USMC Light Armored Vehicle family of vehicles.
- ✦ Our Location – MARCORSYSCOM program office supported by TACOM in Warren, Michigan
  - LAV – in the Light Armored Reconnaissance Battalion
    - Conduct reconnaissance, security, and economy-of-force operations, limited offensive or delaying operations that exploit the unit's mobility and firepower.
    - Eight-wheeled armored combat vehicle with a 25-year history to remain in service until 2025.



**PM LAV...Global Vision - Global Mission**







# MARINE CORPS SYSTEMS COMMAND

*EQUIPPING THE WARFIGHTER TO WIN*



## History of Light Armored Vehicles

| 1970s<br><i>GEN I</i>   | 1980s<br><i>GEN 1.5</i>   | 1990s<br><i>GEN II</i>  | 2000s<br><i>GEN III</i>   |
|---|---|---|---|
|  |    |   |  |
| PIRANHA 6X6<br>- CANADA   | USMC LAV<br>(7 VARIANTS)<br><div><b>Oct 26<sup>th</sup> 2008,<br/>Marine Corps<br/>Celebrated<br/>“25<sup>th</sup><br/>Anniversary of<br/>LAVs in service</b></div> | CANADIAN BISON<br><br>SANG (11 VARIANTS)<br>AUSTRALIA <span>SWIMS</span> | USA STRYKER<br>(10 VARIANTS)<br><br>-NEW ZEALAND<br><br>-CANADA                     |

*PM LAV..Global Vision - Global Mission*





**MARINE CORPS SYSTEMS COMMAND**

***EQUIPPING THE WARFIGHTER TO WIN***



# USMC LAV Fleet



**LAV-AT**



**LAV-C2**



**LAV-25**



**LAV-L**

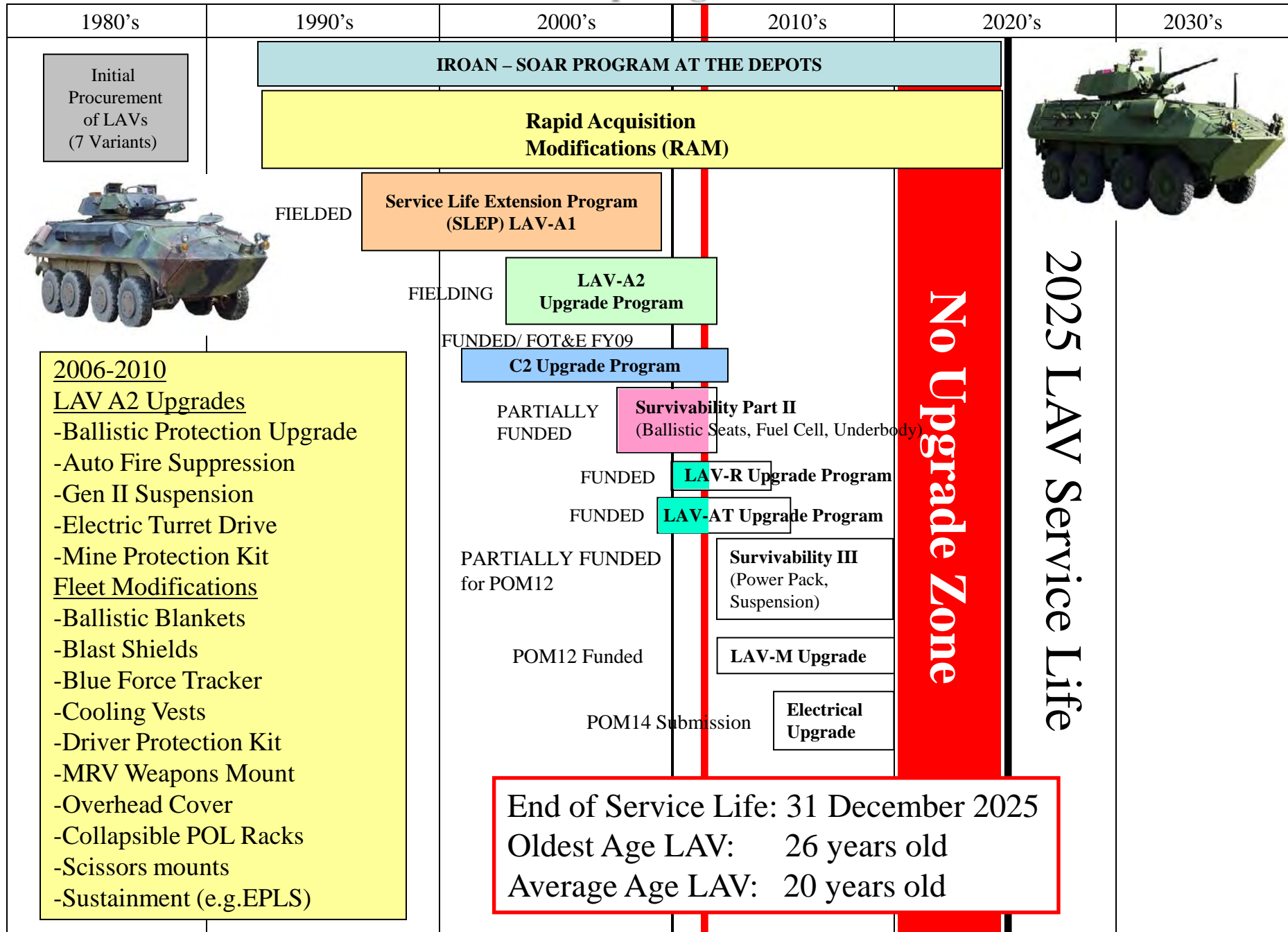


**LAV-M**



**LAV-R**

# Status of Marine Corps Light Armored Vehicles





**MARINE CORPS SYSTEMS COMMAND**

**EQUIPPING THE WARFIGHTER TO WIN**



# LAV-C2 Upgrade Program

✦ The LAV-C2 Upgrade provides an improved communications suite which consists of the following:

- new vehicular intercommunication system,
- five computer workstations,
- improved high frequency radio,
- improved satellite communications,
- situational awareness & fire support systems software/hardware,
- power distribution/management,
- cosite mitigation, and
- improved HFE.

✦ Being fielded.



*PM LAV..Global Vision - Global Mission*





# LAV-ATA2 Modernization Program



## DESCRIPTION

- ☐ The objective is to improve the supportability and mission effectiveness of the LAV-ATA2s by providing the following “mission suite upgrades” on **118** of the Anti-tank vehicles. Of the 118 systems, 115 will be used to upgrade or replace the LAV-ATA2 turrets in the current inventory, 3 will be allocated to cover the remainder of the AAO (i.e.  $115+3 = 118$ )
- ☐ The LAV-ATM program has been designated as an ACAT III program

## CHARACTERISTICS

An Anti-Tank Guided Missile (ATGM) weapon station with:

- ☐ **Improved reliability**, availability, and maintainability
- ☐ **Multiple reload capability** and ability to **acquire targets while on-the-move**
- ☐ Provide LAR Battalion with a precision long-range capability to destroy enemy tanks
- ☐ An improved thermal sight and an advanced fire control system (Modified Improved Target Acquisition System (MITAS)) capable of firing the **current and next generation heavy anti-armor missiles** and ensure training commonality

## STATUS

- ☐ In Source Selection
- ☐ Award planned for December 2011



## LAV-R Upgrade Project



### CHARACTERISTICS

- The proposed upgrade to the crane, generator and winch is more supportable and provides greater lifting and pulling capability. A modern winch with synthetic rope will replace the barrel winch.
- A modern knuckle crane that will increase lifting capabilities and reliability of the entire subsystem.
- A new generator will supply more power for electric tools and the welding system.
- TARDEC Ground Vehicle Integration Center (GVIC) is serving as the system integrator and are developing interface designs, conducting integration, and providing test support.

### DESCRIPTION

This Program is being pursued to replace the current HIAB-FOCO 650/1 ALT crane, hydraulic generator, and Hub 30 Braden barrel winch.

The upgrade will provide a more modern crane, 13 kw generator, and new winch and replace the old PTO that was a long lead item with a COTS item.



## LAV Survivability II

### ✦ Self-Sealing Fuel Cell

- Contract Awarded

## LAV Survivability III

### ✦ Advanced Suspension

- Includes more than just suspension upgrade, also includes:
  - Central Tire Inflation System (CTIS)
  - Anti-Lock Braking System (ABS)
  - Ride Height Management
  - Load Leveling/Sharing
- Improved ride quality reduces O&S costs

### ✦ Power Pack





## Electrical Upgrade

- ✦ Modernize the electrical system for all LAV variants
  - Replace the electrical system with solid-state power management and new turret slipring
  - Replace analog components with CAN J1939 based digital backbone
  - Common displays for driver, vehicle commander and other crew locations
  - Provides improved troubleshooting and diagnostics reducing supply support costs
- ✦ Solution is being developed
- ✦ Full and open competitive contract



## LAV Indirect Fire Modernization



### Description

- Upgrade 71 LAV-Ms with automated extended range 81mm system
- Improves range and responsiveness.
- Will provide the LAR battalion and independent companies with an organic fire support capability that can adequately range threat systems.
- Potential ACAT IV-T Program

### Planned Schedule

- MS B 3rdQtr, FY13
- Contract award 1stQtr, FY14
- MS C 3rdQtr, FY15
- Vehicle upgrades 3rdQtr, FY15-3rdQtr, FY18
- IOC 1stQtr, FY18 (1 Bn/ 2 –Ms)
- FOC 3rdQtr, FY18

### Status

- FY12 New Start
- Milestone document development initiated



## LAV Sustainment Efforts

- ✦ PM LAV Portal (Integrated Digital Collaborative Environment)
- ✦ Joint Asset Maintenance Integrated Support System (JAMISS)
- ✦ Total Life Cycle Management – Assessment Tool (TLCM-AT)
- ✦ Tactical Vehicle Sustainment Test Bed (TVSTB)
- ✦ Portal Maintenance Aids
- ✦ Institutionalized Condition Based Maintenance (CBM+)
- ✦ CMMI Level 2 Certification
- ✦ Reliability Centered Maintenance (RCM)
- ✦ Business Case Analyses (BCA)
- ✦ Energy Initiatives





## Industry Opportunities

- ✦ Increased capability
  - Decreased cost, weight
- ✦ Lighter materials
- ✦ Address capability gaps
- ✦ Capability enhancement

## Meeting with PM-LAV

- ✦ Send an email/call
  - BPT provide your product description
  - If interested, PM-LAV will coordinate a meeting time
- ✦ Plan on speaking 45 minutes with 15 minutes Q&A
- ✦ Be on time
- ✦ TRL 6+

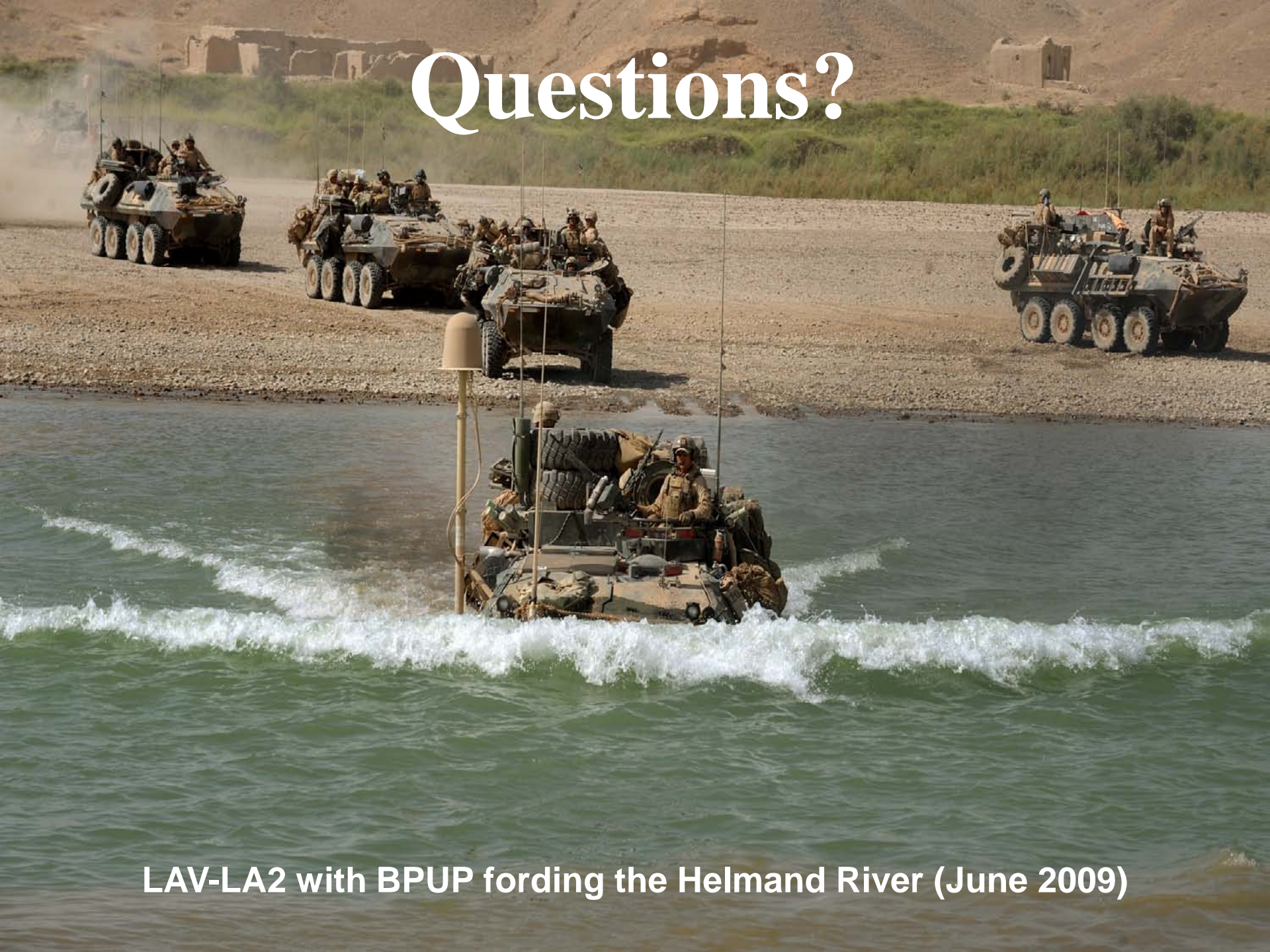


## Conclusions

### PM-LAV Challenges:

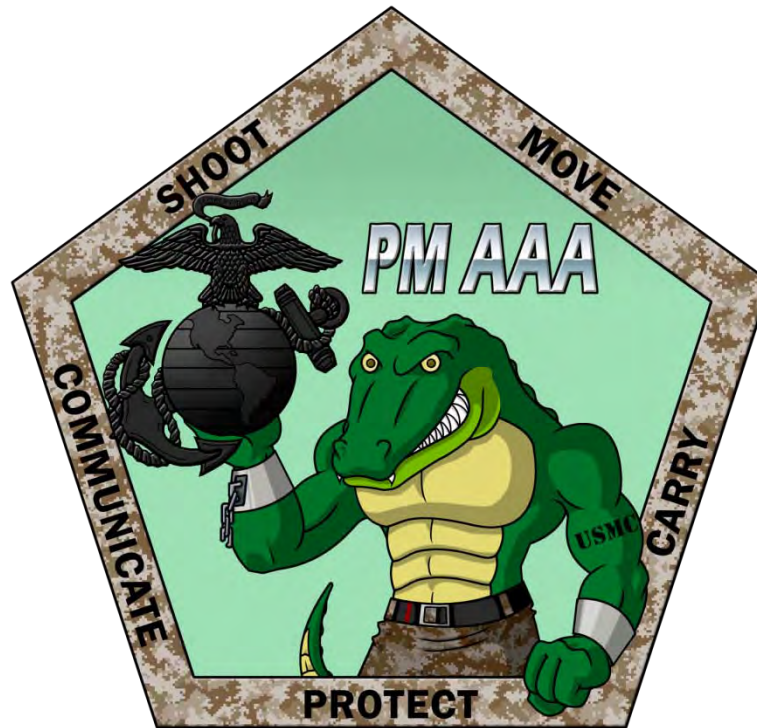
- ✦ Upgrade and sustain the FOLAV to maintain its relevancy until 2025... and potentially 2035
- ✦ Develop and incorporate product support strategies that minimize TOC across the fleet

# Questions?



LAV-LA2 with BPUP fording the Helmand River (June 2009)





# **PM AAA**

# **NDIA Conference**

**25 October 2011**



# AMPHIBIOUS VEHICLE WAY AHEAD

## Overarching Facts

- Joint Operational Access capability is required across the range of military operations
- 2 Marine Expeditionary Brigade (MEB) Assault Echelons is the minimum required forcible entry sea-based capacity for Operational Access and supports crisis response, security cooperation and theater engagement requirement
- 2006 Strategic Planning Guidance (SPG) guidance to better balance the Ground Combat Tactical Vehicle (GCTV) Portfolio resulted in a track/wheel mix of Armored Personnel Carrier (APC) capability (8:4 ratio) in order to meet the Service capacity requirement of 12 battalions of lift for Marine Corps operational scenarios

## Acquisition Programs

- Assault Amphibious Vehicle (AAV) Upgrade increases force protection and vehicle survivability levels of the current capability in order to sustain operations ashore against current threats to extend its service life until replaced by the Amphibious Combat Vehicle (ACV) and Marine Personnel Carrier (MPC).
- ACV will provide sea-based entry and land maneuver capability to come from over the horizon (12-18 NM)
- MPC supports expeditionary protected mobility requirements by enhancing Marine Operating Forces' tactical & operational mobility with balanced levels of performance, protection & payload



# TRANSITION FROM EFV TO ACV Requirements Development

## ➤ Systems Engineering OPT

- Evaluate cost & technical risk associated with requirements (water speed, survivability, lethality eg.)
- Evaluate various system concepts to better define capability versus affordability trade space
- Utilize data to develop systems concepts for use in the AoA
- Systems concepts evaluated represent a continuum from minor upgrades to the legacy platform up to high-end new vehicles

## ➤ New Efforts in Support of ACV Requirements Development

- Hull demonstrator to explore achievable protection levels in an amphibious tracked vehicle
- Market research/trade study of remote weapon systems & variable height suspensions
- Evaluation of suitability/effectiveness of remote weapon systems for AAV, MPC, or ACV





# A PORTFOLIO APPROACH TO COMPLEMENTARY CAPABILITIES

## ➤ Overarching CD&I Objective:

— *Marine ground combat forces require expeditionary protected mobility throughout the extended littoral operational environment across all types of terrain*

- *ACV & MPC are part of a portfolio of capabilities that provide closure to real world operational gaps and shortfalls in the ability of the MAGTF to conduct ground based maneuver tasks*
- *The MPC, as the medium capability category platform, provides a bridge in capability between the ACV and JLTV*
- *Distributed Combat Power - 2 MPCs will lift a reinforced rifle squad*
- *MPCs will be supported by JLTVs carrying heavy weapons, communications equipment, and cargo*
- *In conjunction with ACV the MPC will meet GS lift requirements for Marine Infantry across the ROMO*
- *ACV is optimized for JFEO/MCO while MPC is better suited for the fight in restricted terrain against irregular threats*



***“Our Ground Combat & Tactical Vehicle Strategy is designed to field and support a portfolio of complementary capabilities - No one vehicle can do it all while being affordable and singularly operationally effective across the ROMO”.***



# AAV UPGRADE



**Mission:** General Support Lift / Amphibious Mobility

**Dimensions:** H: 130 in  
W: 130 in  
L: 321 in  
Wt: 46,330 lbs (curb wt)

**Weapons:** HMG

**Payload:** 21 Infantry Marines + 3 Marine crewmen

**Range:** 200 miles

**Speed:** Effective with M1A1 off-road / 6 knots in water

**Acquisition Status:** Pre MS-B

**Acquisition Objective:** 392

**IOC/FOC:** FY17/FY23

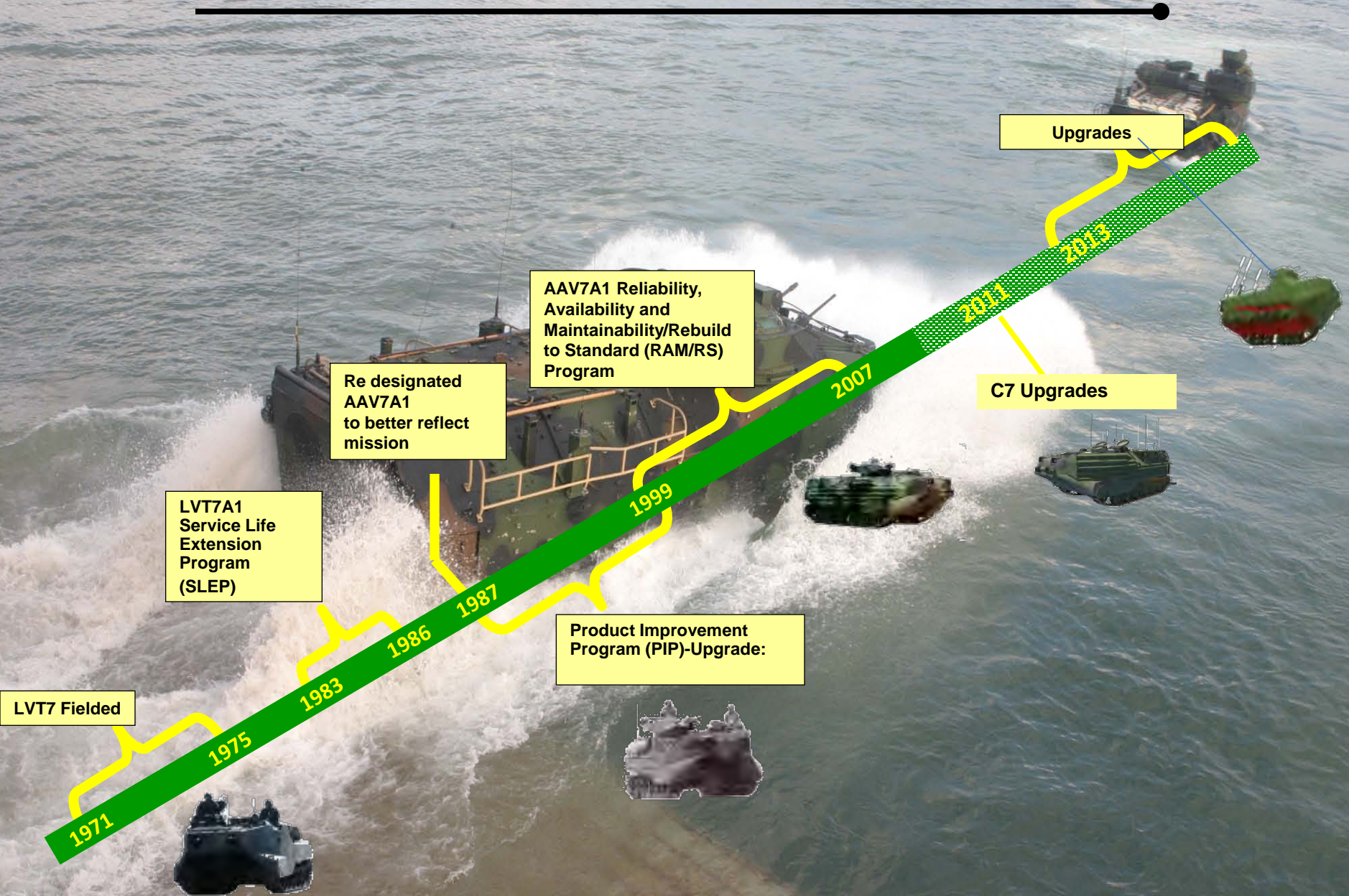
**Approximate Unit Cost to Upgrade:** \$1.5M

- AAV Upgrade AAO provides 4 Infantry Battalions lift capacity to the MAGTF

- *The AAV Upgrade is to be a bridge capability to ACV. Focus - restore operational relevance to the AAV by updating outdated protection attributes*



# AAV TIMELINE







# AAVC7 C2 UPGRADE/ FUTURE UPGRADES

- **Current C7 Upgrade**

- C7 AAO of 76 vehicles to be upgraded
  - 60 vehicles to be fielded prior to August 2011; production closed out with SPAWAR
  - 16 remaining vehicles to be completed in coordination with MPS backloads/IROAN
  - IIP (spares) at SMU/RIP
- NETT
  - CAB only command remaining

- **Future Upgrades as of September 2011**

- Underbody armor
- Sponson armor
- Blast mitigating seats; crew and troops (3+17)
- Contact and spaced spall liners
- Fuel tank protection
- Spray in Floor Liner & blast mitigating liner
- Engine/transmission and supporting components upgrade to support added weight
- Suspension and dual pin track



# WHY AMPHIBIOUS COMBAT VEHICLE

## Summary of Capability Gaps\*

- When required to conduct amphibious operations and subsequent operations ashore in a denied or contested environment, the legacy platform (Assault Amphibious Vehicle) presents the following capability gaps
  - Water/Land Mobility: Cannot close to the beach from extended launch distances prescribed in future Navy CONOPS
  - Protection: Cannot protect its occupants from IED's
  - Network: Cannot communicate critical information requirements to the sea base
  - Lethality: Cannot achieve direct fire overmatch against threat peer vehicles identified in the System Threat Assessment Report

\*Amphibious Combat Vehicle Initial Capabilities Document, pages 12-13

# Ground Combat Tactical Vehicles

BGen Dan O'Donohue

USMC Capability  
Development Command







CPL DAKOTA MEYER

**MEDAL OF  
HONOR**

LIVING RECIPIENT



# Joint Expeditionary Force in Readiness



## *Core Missions*

### Crisis Response



### Assuring Littoral Access



Historically Based Knowledge, Expertise & Success





# The World We Live In...What We Expect...

## Wars Amongst the People



## Hybrid Threats



Sea lanes

Sea lanes

Sea lanes

Sea lanes

Sea lanes

Sea lanes

**Access  
challenges...**

***Largely in the Littorals***

## Complex Terrain



## Information Environment



- 75% of people live w/in 200mi of a coast
- 70% of world is water
- 95% of international communications travels via underwater cables

- 23,000 ships are underway daily carrying 90% of the world's international commerce
- 49% of the world's oil travels through 6 chokepoints
- 25% of the world's oil and gas is drilled at sea

# A Maritime Nation with global responsibilities







# 26th Marine Expeditionary Unit

BLT 3/8, VMM-266 (REIN), CLB-26

DEPLOYMENT DATES: AUG 2010 – MAY 2011

USS KEARSARGE (LHA-3)

USS PONCE (LPD-15)

USS CARTER HALL (LSD-50)



JORDAN OPERATIONAL  
DEPLOYMENT PROGRAM  
22 NOV 10 – 4 DEC 10

ODYSSEY DAWN  
19-30 MAR 11 – Air strikes  
22 MAR 11 – Recovery ops

OEF Combat Ops  
JAN 10 – MAY 11

PAKISTAN HA/DR  
4 SEP 10- 10 NOV 10

SHAMAL 10  
9 – 20 NOV 10

IRON MAGIC  
12-23 DEC 10

JOINT OPS  
Sep-Dec 10

EDGED MALLETT  
15-29 NOV 10



Aug 2010: Deployed one month early to Pakistan  
Sep-Nov 2010: Humanitarian relief 400 miles into Pakistan  
Sep-Dec 2010: Operations and engagement in Persian Gulf, Jordan, Kenya and Horn of Africa  
Jan 10–May 11: Combat ops in Helmand Province, AFG  
Feb 2011: Egypt contingency response from the Red Sea  
March 11: Ordered to execute operations in Libya  
Reinforced from Camp Lejeune  
MV-22s self deploy from CENTCOM to Med.  
March 2011: Strike operations and recover downed airmen in Libya  
May 2011: Return to Camp Lejeune, NC

## If Not an ARG/MEU Then What?





# Ship to Objective Maneuver

## ❖ Mobility

- ❖ Vertical & surface options
- ❖ Capability & capacity for high & low-end

## ❖ Command and Control

- ❖ Decentralized execution & common picture

## ❖ Intelligence

- ❖ Locate & identify forces & impediments to mobility
- ❖ Pull vice push information

## ❖ Fires

- ❖ Immediate & responsive – all weather – lethal & non lethal
- ❖ Unmanned systems

## ❖ Information Operations and Computer Network Operations

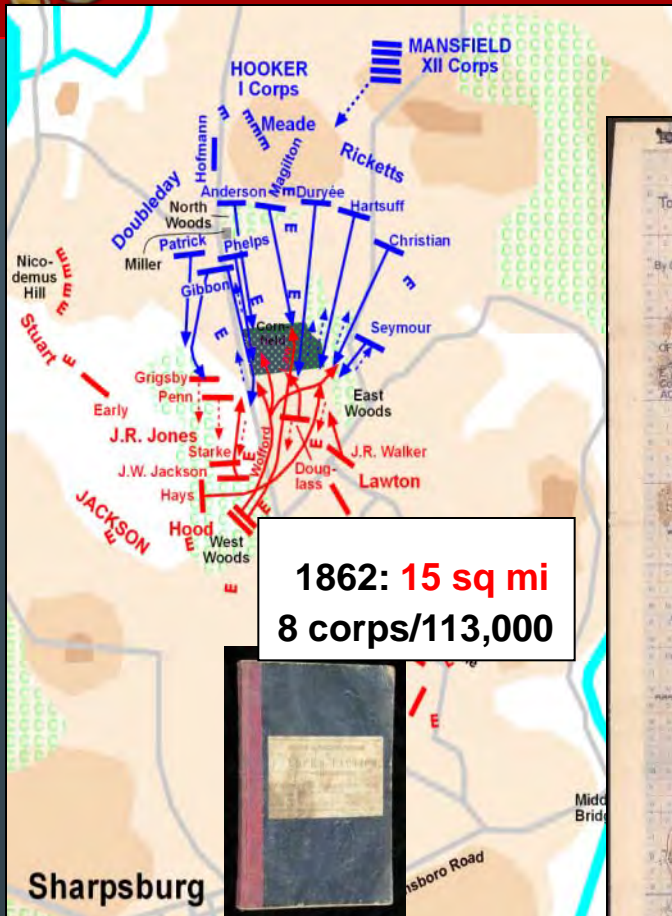
## ❖ Sea-based Operations and Logistics



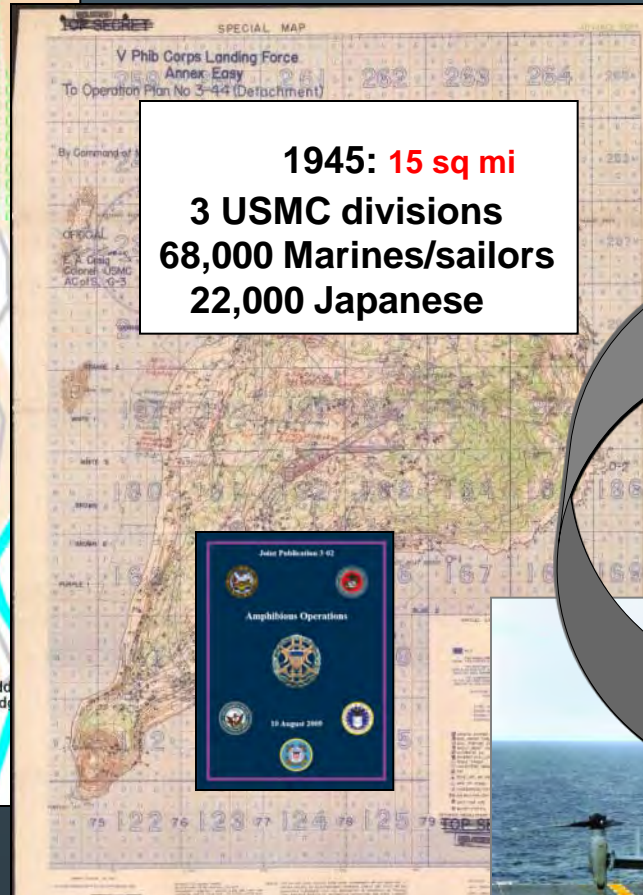




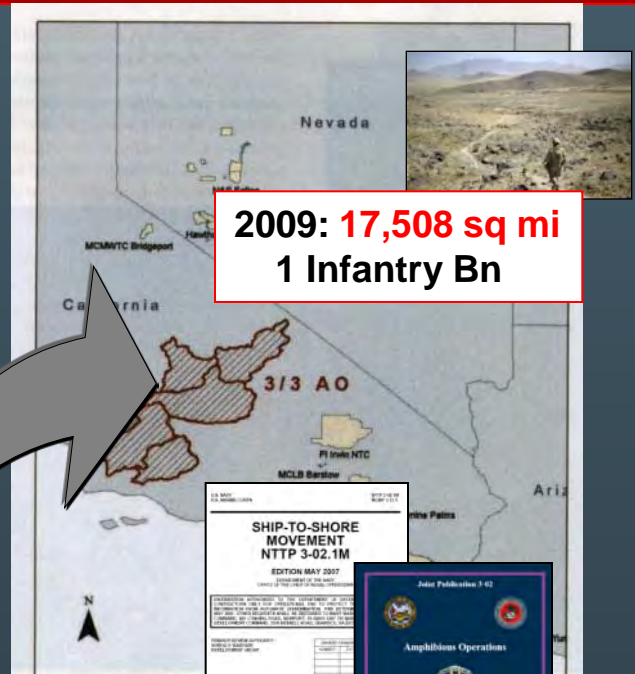
# Our Challenge is not just the “Nature of the Enemy”



1862: **15 sq mi**  
8 corps/113,000



1945: **15 sq mi**  
3 USMC divisions  
68,000 Marines/sailors  
22,000 Japanese



2009: **17,508 sq mi**  
1 Infantry Bn

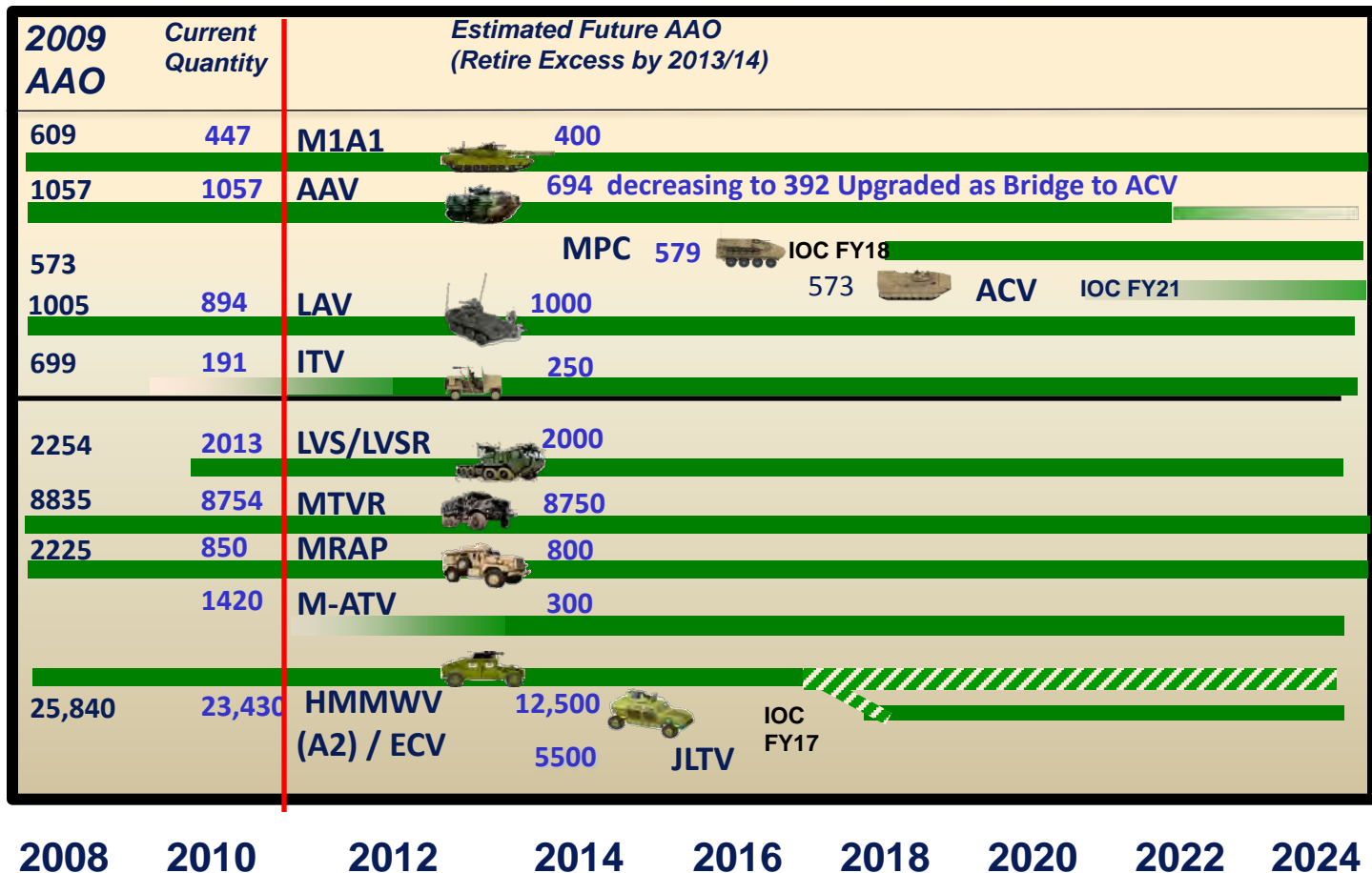


There is a tyranny of distance and distribution. Our challenge is make it an advantage – not a liability.

“Recognize that small, distributed, agile general purpose tactical formations are a nightmare for enemy commanders.”



# 2011 Ground Combat Tactical Vehicle Strategy







# What an Amphibious Combat Vehicle Does



**Critical Link – the ACV gains access from the sea for the joint force .....crosses the surf zone ...gets off the beach .....to the objective**



- Rolls out of the well deck of a landing ship combat ready
- Transitions without pause at the water line ready to fight
- Breaches natural and man-made water & land obstacles



✧ *An Amphibious Combat Vehicle will successfully cross ground where other vehicles get stuck*



- Gets the landing force off the beach
- Protects the force during offensive & defensive operations

✧ *An Amphibious Combat Vehicle protects combat ready cohesive units and delivers them into the fight without pause*



- Expands a commanders maneuver options
- Maneuvers combat power in a single lift to defeat the enemy or deter aggression

✧ *An Amphibious Combat Vehicle delivers mass and lethality in the attack ...reduces the risk by quick build-up of force during a lodgment ashore*



- Carries the supplies and gear to sustain that combat unit through the assault







# ***Amphibious Combat Vehicle (ACV)***



## **Description**

The Amphibious Combat Vehicle (ACV) replaces the canceled Expeditionary Fighting Vehicle (EFV) with personnel and C2 variants within the Family of Vehicles (FOV). The ACV will not have the high water speed/planing requirement.

Mission: Amphibious Mobility/Firepower

Dimensions: H: ~130 in  
W: ~130-146 in  
L: ~320-370 in  
Wt: ~50,000 – <80,000 lbs GVW

Weapon: TBD

Fire control: TBD

Capacity: 17 PAX + 3 Marine crew

Range: ~ 120 - 200 miles land, after a 12 nm swim

Speed: ~ 45 mph land, ~ 8 kts sea

Acq Status: Pre MS A

Acq Obj: TBD

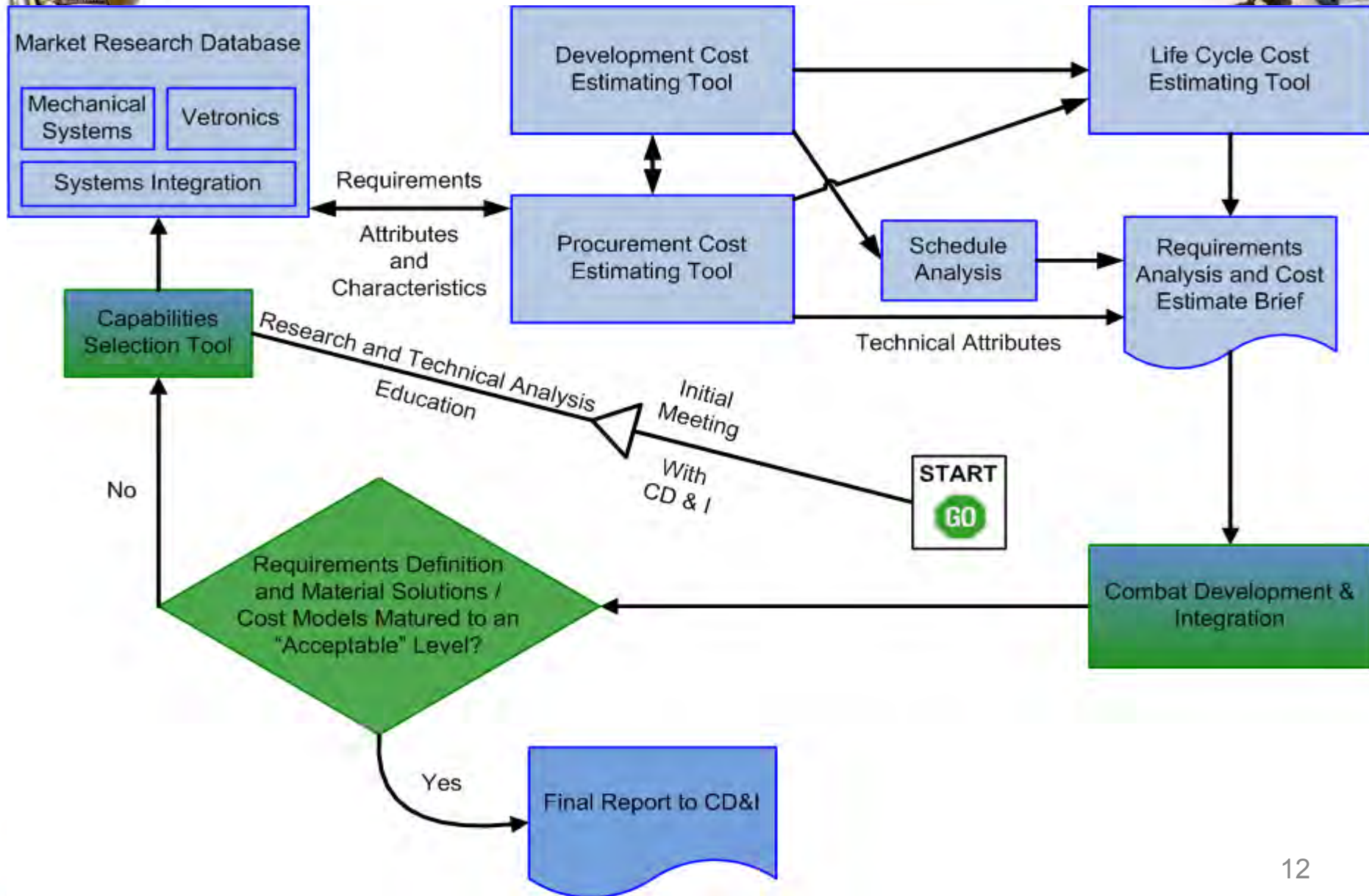
IOC/FOC: TBD

Approx Unit Cost: TBD

Modernized the Assault Amphibian Battalion.



# Systems Engineering OPT Process











# LAV & MPC



## LAV – in the Light Armored Reconnaissance Battalion.

- Mission – To conduct reconnaissance, security, and economy-of-force operations, limited offensive or defensive operations that exploit the unit's mobility and firepower.
  - **Conduct Reconnaissance for GCE or MAGTF commander in the close and deep battle space**
  - **Conduct security operations to protect the GCE or MAGTF**
  - **Win the counter-reconnaissance fight**
  - **Exploit opportunities with long range firepower and mobility**
- Eight-wheeled armored combat vehicle with a 25-year history to remain in service until to 2025 and possibly beyond.



## MPC – will reside in the Amphibious Assault Battalion.

- Mission – To provide armor-protected mobility for infantry battalion maneuver task forces. Two MPC lift a reinforced rifle squad.
- The MPC program balances vehicle performance, protection, and payload attributes.





# Joint Light Tactical Vehicle (JLTV)



Mission: Light Combat mission roles and fwd Cmd  
Dimensions: H: ~85 in operating ht (reducible to 76 in)  
W: ~96 in  
L: ~207 in  
GVW: below 20k lbs

Weapons: .50cal/Mk19, TOW, Remote weapon

Expeditionary: CH53, CH47, Amphib and MPF compatible

Speed: 70 mph, 45 mph on 5% grade

Range: 300 miles

Acq Status: MS B 2012  
Acq Obj: 5,500 (Increment 1)  
IOC/FOC: 2017/2022  
Approx Unit Cost: \$360K

Variants:  
Weapons carrier  
Gen Purpose  
TOW carrier  
Utility  
Fwd C2

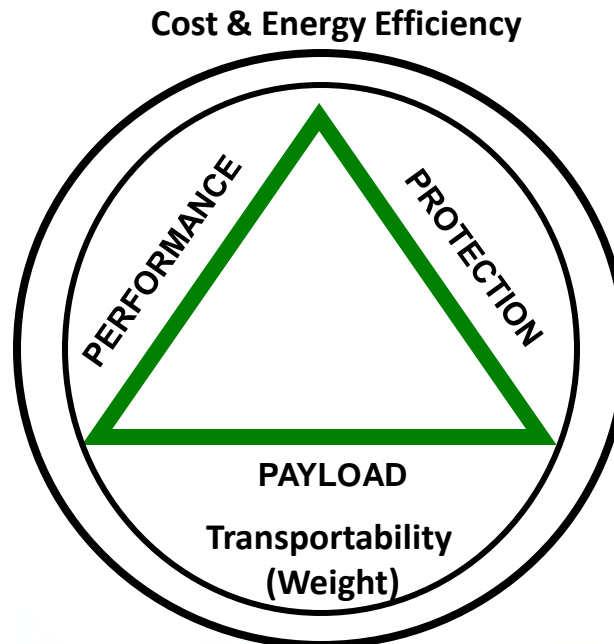


# Affordability and the Iron Triangle



## Cost further constrains the Iron Triangle:

Field an affordable fleet of ground combat and tactical vehicles that provide required capabilities and adequate capacity to meet the operational demands of the expeditionary MAGTF.



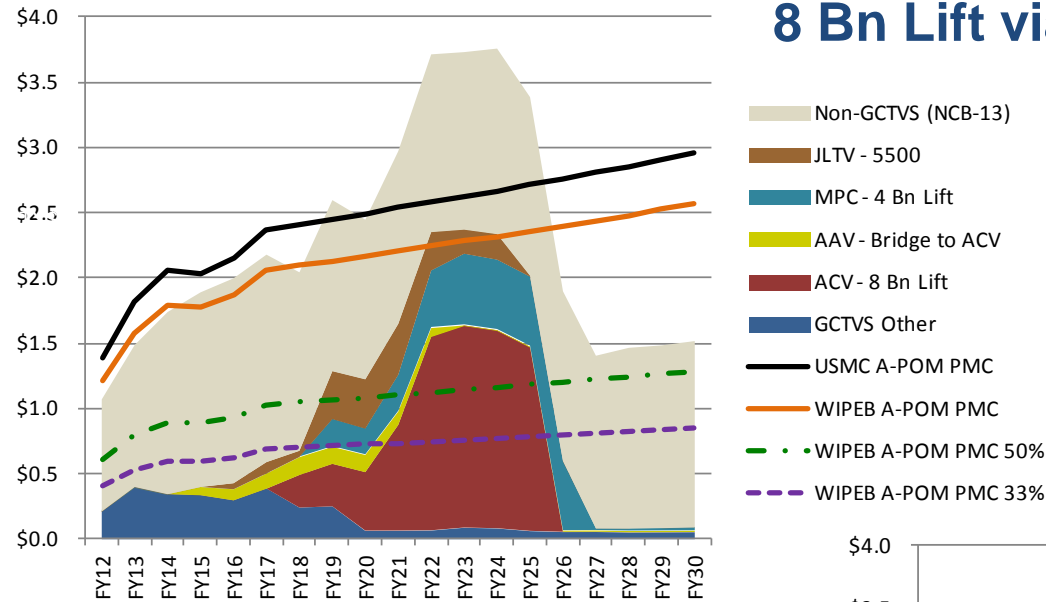




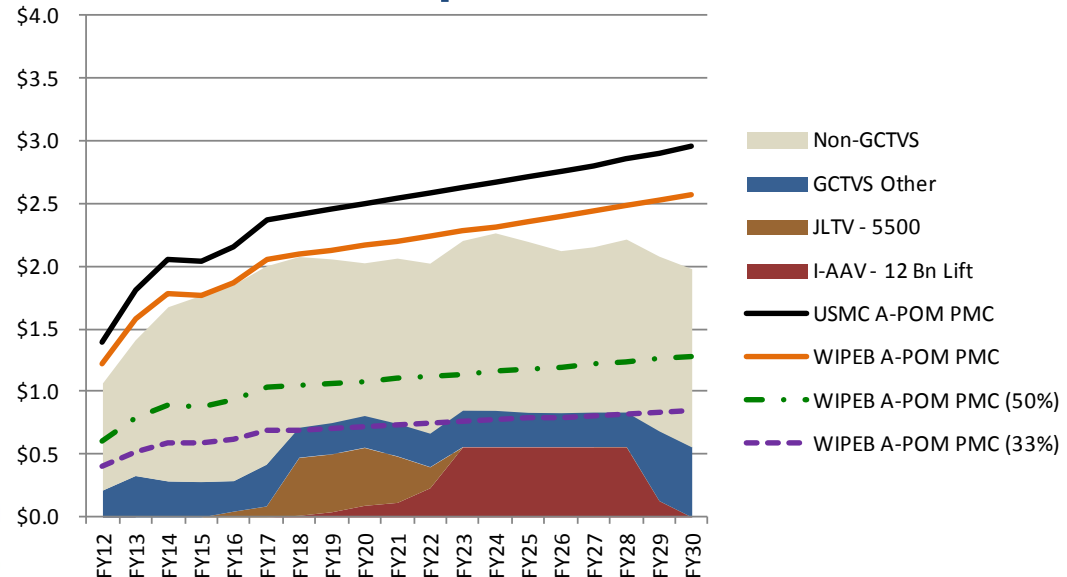
# Managing Affordability



## 8 Bn Lift via ACV / 4 Bn Lift via MPC

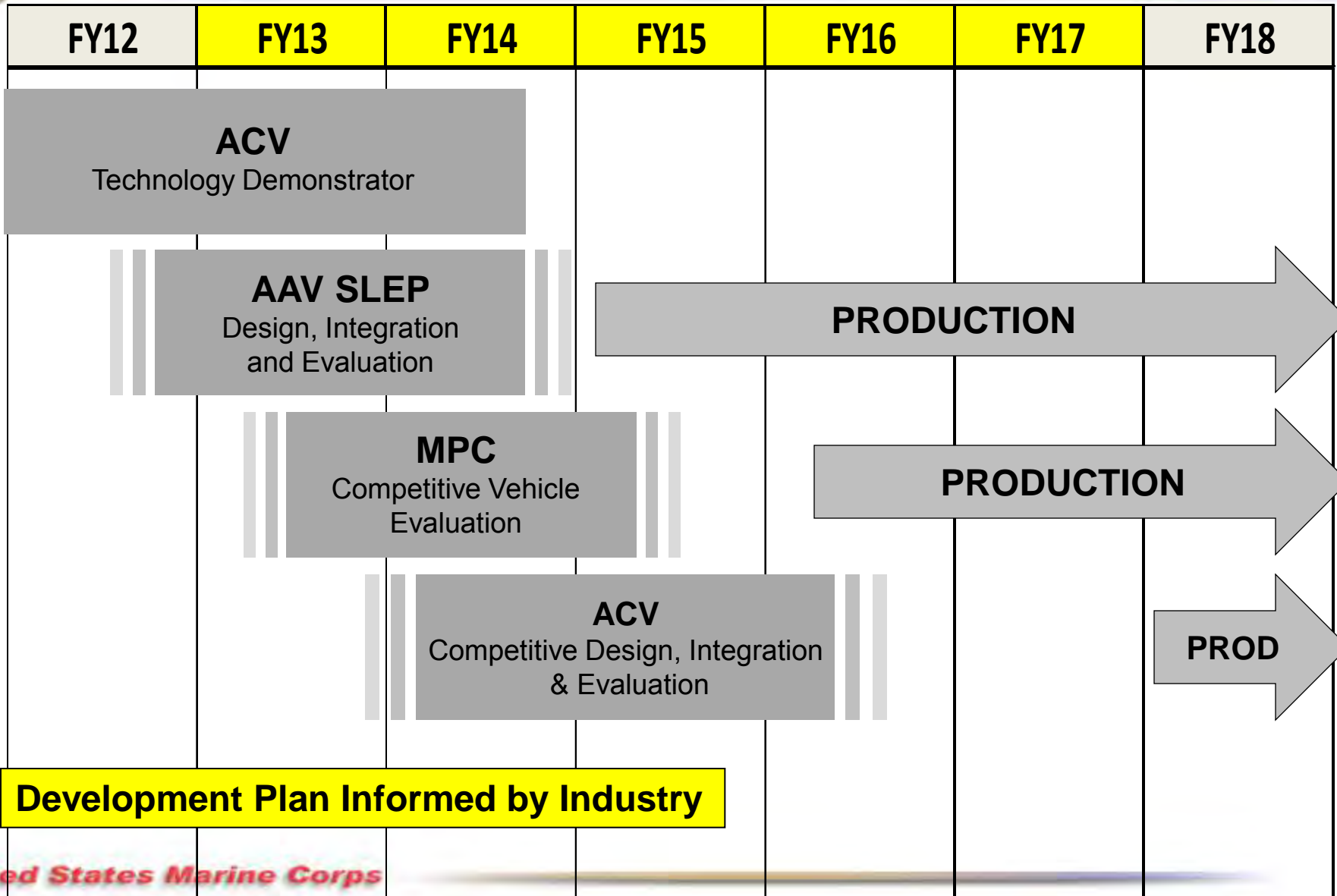


## AOA Option





# Acquisition Way Ahead









**RISK**

# NDIA Combat Vehicle Conference

**26 October 2011**

**William Sheehy  
Colonel, Infantry  
Project Manager**



# Current Situation

**Issue:** Current HBCT platforms are at or **exceeding Space Weight and Power (SWaP)** limitations while the Army continues to add / increase capabilities (CREW III, JTRS, MSS, etc.)

## Bradley

**Spec Weight:** 36.3 tons  
**Power Available:** 11200 watts



**Current Weight:** 39.25 tons  
**Power Deficit:** - 5506 watts

## Abrams

**Spec Weight:** 70.0 tons  
**Turret Power Available:** 8960 watts



**Current Weight:** 76.0 tons  
**Turret Power Deficit:** - 2664 watts\*  
\* With GMR

## Paladin A6

**Spec Weight:** 31.8 tons  
**Power Available:** 18200 watts



**Current Weight:** 33.1 tons  
**Power Deficit:** - 4098 watts



**M113**  
**Terminated 2007**





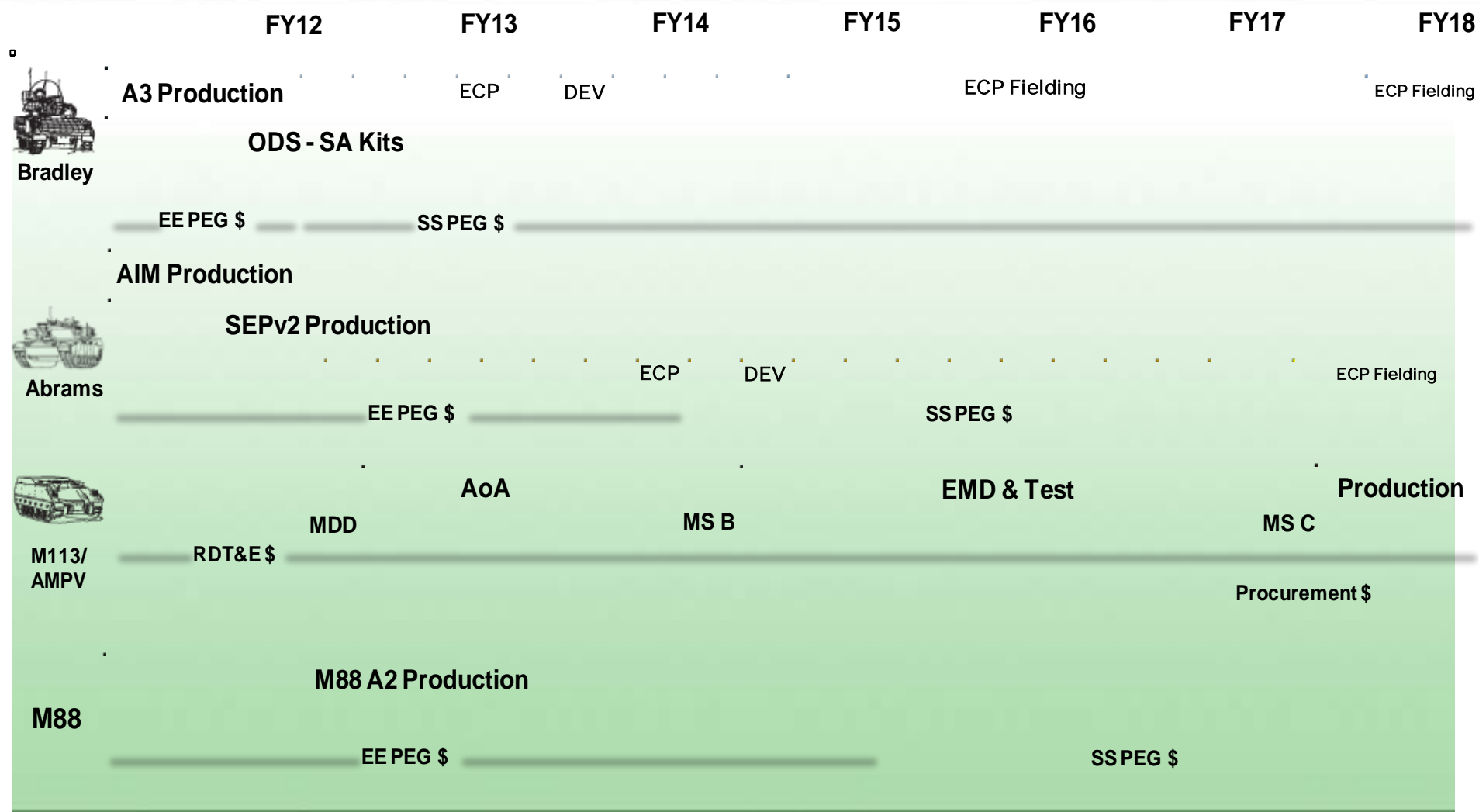
# Combat Vehicle Portfolio Modernization Concept of the Operation



- The Army will execute a two-phased capabilities enhancement initiative across the Combat Vehicle Fleet.
  - Phase I ECP (Near Term): ASARC approved 8 June 2011
    - Abrams and Bradley programs will execute a series of Engineering Change Proposals (ECPs) reestablishing Space, Weight, Power and Cooling (SWAP-C) to facilitate integration of technologies being developed under existing Programs of Record (POR) (PEO/Army Decision).
    - Proposed ECPs will restore lost capability, not to exceed operational envelopes outlined in current requirement documents.
  - Phase II Modernization (Long Term):
    - Combat Vehicle MDD Canceled in Aug 2011. VCSA directed Abrams & Bradley not to execute MS programs. Look to expand ECP efforts.
    - Cost Benefit Analysis needed to determine which technologies to propose additional ECP efforts.
    - GCV enters the Technology Development phase (not included in this briefing).
    - AMPV will be a MS program. Awaiting AoA study guidance approval IOT execute MDD.



# Execution



Distribution Statement A: Approved for public release; distribution is unlimited



# Focus Area

- 1) **Space Weight and Power (SWaP):**
  - **Must demonstrate how you make the system better by reducing the SWaP burden while adding capability**
- 2) **Commonality:**
  - **Commonality can be achieved at the circuit level or the component level**
  - **Not all “commonality” is good: must provide cost savings**
- 3) **Schedule:**
  - **Time is critical, won't be able to do everything**
- 4) **Cost:**
  - **“Zero Sum”, cost growth in an area will result in reductions in another**





# Phase I ECP Technologies

## **GAP: Network Enabled**

### **Network Compatibility**

- Joint Tactical Radio System – Handheld/Manpack/Small Form Fit (JTRS HMS)
- Joint Battle Command – Platform (Block Upgrade)

### **Power Generation/Distribution**

- Battery Monitoring System
- 1000A Alternator
- Slip Ring

### **Line Replaceable Modules (LRM)**

- Improved Commander's Display Unit
- Improved Commander's Electronics Unit
- Improved Hull Mission Processor Unit
- Improved Turret Mission Processor Unit
- Improved Driver's Integrated Display
- Improved Gunner's Control Display Panel
- Analog Input Module
- Improved Fire Control Electronic Unit

## **GAP: Lethality Ammunition Data Link**



## **GAP: Protection**

**Integration Kit for Counter Radio-Controlled IED  
Electronic Warfare (CREW/Duke 3)**

**Armor Upgrade**

**GAP: Sustainment  
Auxiliary Power Unit (APU)**

Distribution Statement A: Approved for public release; distribution is unlimited



# Phase I ECP Technologies

● Integration Ready (ECP1)

● Integration Ready (ECP2)

## Power Train

- 675 HP Power Pack Upgrade
- 800 HP Transmission Efficiencies
- Cooling System Modification



## Suspension & Track

- Extended Life Track
- Heavy Weight Torsion Bars
- Dampers and Road Arms

## Electrical System (low)

- Electrical Power Upgrade (600 Amp generator)
- High Speed Slip Ring Upgrade
- 1 G Ethernet Switch
- VHMS, Phase I
- Battery Management
- Begins VICTORY architecture compliance

## Situational Awareness

- Improved FBCB2 Integration
- Common Intelligent Display

## Enabled Capabilities

- FBCB2, JBC-P
- JTRS
- CREW v3
- Embedded Training
- Gun Shot Detection

**Addresses some capability gaps and Army inbound technologies.**



# Network Compatibility

## ■ Description of Technology

- Integration of the Government Furnished Equipment (GFE) JTRS Handheld, Manpack, and Small Form Fit (HMS) radio and Joint Battle Command – Platform (JBC-P)
- JTRS-HMS replaces the Single Channel Ground and Airborne Radio System (SINCGARS) and Enhanced Position Location Reporting System (EPLRS) capabilities
- JBC-P is the next iteration of the FBCB2 program. It is a joint, digital, family of systems that provides integrated, on-the-move, timely, relevant C2 & SA information to tactical combat, combat support and combat service support commanders, leaders, and key C2 nodes

## ■ Description of Capability

- Maintains the ability to disseminate critical information
- Supports the need to establish network readiness and maintain Battle Command and Communications interoperability with future Brigade Combat Teams (BCT)
- JTRS-HMS offers a 2 channel software defined radio that supports both legacy (SINCGARS) and future Soldier Radio Waveform (SRM), and Mobile User Objective System (MUOS) communications waveforms
- JBC-P provides command and control at the platform level across the Services enabling joint situational understanding and battle space awareness. It provides Joint interoperability between Service and SOF platforms operating in the Joint Operations Area
- JBC-P includes Unified Battle Command (UBC) identified upgrades including Chat, Email, Low Bandwidth Imagery, and full NetOps and provides the ability to share imagery data and incorporates Integrated Tactical Ground Reporting (TiGR) capability

Distribution Statement A: Approved for public release; distribution is unlimited





# Power Generation & Distribution

## ■ Description of Technology

- Include the Improved Amperage Alternator, Slip Ring, Hull Power Distribution Unit (HPDU)/Remote Switching Modules (RSMs), and the Battery Monitoring System (BMS)

## ■ Description of Capability

- Addresses the power demand growth potential and the need for dissemination of critical information
- The modified Slip Ring will have the capability to pass increased radio frequency (RF) and power to the turret
- Due to the changes to the alternator and the slip ring, upgrades to the HPDU and RSMs are also required
- An increase in vehicle power generation with the Improved Amperage Alternator and improved power distribution with the modified Slip Ring is needed because there is no power margin remaining in the turret of the Abrams or Bradley
- The BMS is required for the user to know the current status of the batteries that are needed for starting and maintaining silent watch capabilities



# Battery Monitoring System

## ■ Description of Technology

- Additional power generated will be distributed to the vehicle hull and turret to support the increased power demands from the implementation of increment 1 technologies
- Provides all vital information on each battery and tell the user what maintenance or when replacement is recommended
- Starts and helps maintain silent watch capabilities and supports power management of the system

## ■ Description of Capability

- Reduce SWaP (Space, Weight, and Power)
- Regain interior volume for crew and equipment
- Increased energy efficiency
- Reduces O & S costs
- Enables Commonality within the PEO GCS community
- Leverage industry and other services specifications
- Regain growth potential enabling all systems/sub-systems in the vehicle to operate simultaneously, without the need to prioritize and shut down systems/sub-systems



# Line Replaceable Modules (LRM) (Abrams is Lead )



## ▪ Description of Technology

- Cards/Modules are packaged to allow static free handling in vehicle
- Leverage industry standard for single board computers interfaces
- Multiple SBC vendors make these products
- Supports emerging VICTORY Architecture

## ▪ Description of Capability

- Reduce SWaP (Space, Weight, and Power)
- Regain interior volume for crew and equipment
- Increased energy efficiency
- Reset Obsolescence Clock
- Supports 2 level Maintenance
- Now capable to replace cards in the field
- Supports diagnostics to individual cards
- Supports VHMS/CBM+
- Reduces O & S costs
- Leverage industry and other services specifications
- Enables Commonality within the PEO GCS community

| Acronym | M1A2 SEP v2 LRU Nomenclature            |
|---------|---|
| ICDU    | Improved Commander's Display Unit       |
| ICEU    | Improved Commander's Electronics Unit   |
| IHMPU   | Improved Hull Mission Processor Unit    |
| ITMPU   | Improved Turret Mission Processor Unit  |
| IDID    | Improved Driver's Integrated Display    |
| IGCDP   | Improved Gunner's Control Display Panel |
| AIM     | Analog Input Module                     |
| IFCEU   | Improved Fire Control Electronic Unit   |





# Auxiliary Power Unit (APU) (Abrams Only)

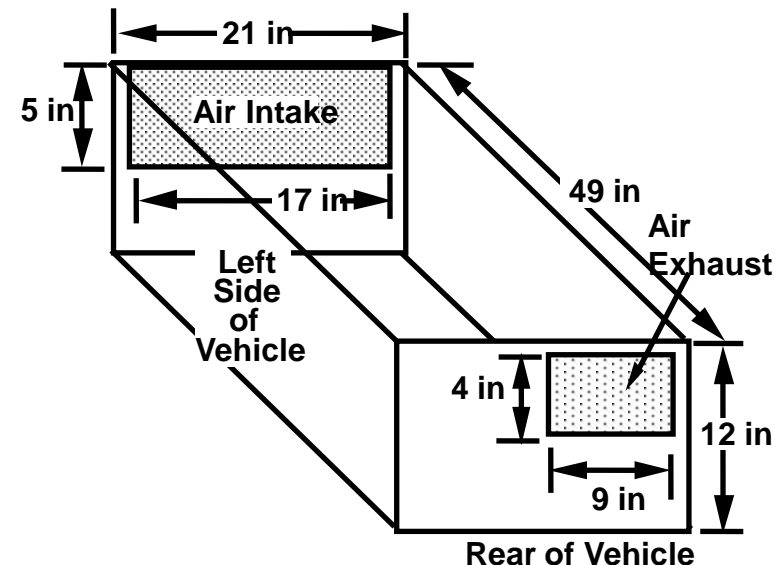


## ■ Description of Technology

- A minimum of a 10kW auxiliary power generating unit using conventional mature technologies (diesel/turbine) to power on-board systems with a reduced noise signature
- The unit will be integrated in the left sponson of the hull, and will be under armor
- Mounting and interface including shock mounts, shall reside within the APU space claim
- It will have full operator interface for operation control, monitoring critical parameters, and health and fault signals

## ■ Description of Capability

- Provides capability to operate on-board systems with a reduced probability of detection during main engine off, or silent watch operation
- More cost effective and fuel efficient than the main engine to support operation of key systems for a duration of 12 hours (T) from a stationary tank, and provide power to start the vehicle
- Extends current M1A2 SEP v2 capability to support power demands of future inbound technologies





# Commonality



- **As part of the Heavy Brigade, PM Abrams and Bradley are focusing on areas of Commonality across the fleet.**
  - ECP effort will include
    - Scope to collaborate and foster commonality
    - Collaborative system engineering to look for common solutions
    - Commonality as a key criteria for trade studies
- **Developing areas of commonality are:**
  - HBCT Common Environmental Specification for design of new components
  - VICTORY 1.0 Standard Architecture Specification for new components



# Phase I ECP Summary



- **The Abrams Tank and Bradley Fighting Vehicles will continue to evolve**
- **Current Bradley Fleet cannot host current in-bound technologies**
- **Upgrades/modifications will be applied through an ECP or multiple ECPs**
- **Requirements trace is to the current ORD**
  - Phase 1 technologies are confirmed
  - Analyzing potential Phase 2 technologies
- **Updates for the M1A1 Fleet being considered**
  - Ammunition Data Link
  - Network Upgrades

**“Sustain the current fleet.... Modernize for the future.”**





# AMPV



Distribution Statement A: Approved for public release; distribution is unlimited



# Disclaimer



- **The Armored Multi-Purpose Vehicle (AMPV) Program is the proposed Army program for replacement of the M113 Family of Vehicles within the Heavy Brigade Combat Team.**
- **This program is still pending an FY12 Materiel Development Decision (MDD) that will define the program, to be followed by an Analysis of Alternatives (AoA) that will confirm the system or systems that will replace the M113.**
- **The Army will consider existing or programmed solutions which may include, but are not limited to, derivatives of the Bradley Fighting Vehicle, Stryker variants, Mine-Resistant Ambush Protected (MRAP) vehicles, variants of the Ground Combat Vehicle, or other systems.**
- **No activity to identify or select a systems contractor or contractors will begin until after the MDD decision is made and the AoA is complete.**



# Mission Roles of the M113 FOV

AMPV  
focuses  
here

1. **Command and Control**
  - Maneuver
  - Fires
  - Engineer
2. **Medical**
  - Evacuation
  - Aid Stations
3. **Fire Support**
  - Mortar Carriers
  - Fire Direction Centers
4. **First Sergeant**
  - Primary Vehicle
5. **Mobility/Counter Mobility**
  - Sapper Companies
  - Mobility Augmentation Companies
  - Volcano
6. **CS/CSS**
  - Maintenance Vehicle
7. **Chemical**
  - Smoke Vehicle





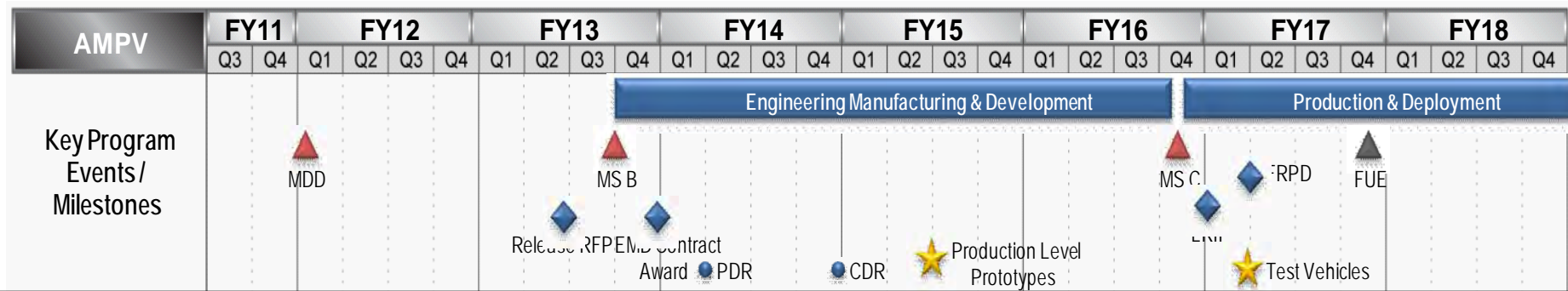


# AMPV Projected Schedule

assumes Bradley Derivatives



## Armored Multipurpose Vehicle (AMPV) Program Schedule



Distribution Statement A: Approved for public release; distribution is unlimited



# Bradley Derivatives Proposed Technologies



## GAP: Protection

- Existing Bradley Capabilities
  - Belly Armor Kit
  - Reactive Armor Tile Provisioning
  - Bradley Urban Survivability Kit (includes mine/IED seating)
  - Drivers Vision Enhancement (part of CM/ED)
- Gunner protection kit
- CREW v3 A-kit
- Roof armor (former turret area)
- COTS Litter Kit and Medical MEP
- Environmental Cooling System (Medical variants)

## GAP: Network Enabled

- Smart Display Unit/FBCB2 Display
- SINCGARS Radio A-kit integration
- Provision for future C4ISR power requirements
- M1068 C2 communications/C4ISR A-kits

## GAP: Mobility

- Use of Bradley A3 Hull configuration
- BFV A3 600hp powertrain
- Chassis Modernization w/ Embedded Diagnostics and DV
- BFV A3 Suspension and T157 Track
- External Fuel Tanks
- TC Hatch



Red = Current Bradley

## GAP: Lethality

- Flexible mounted crew-served Weapon
- M1064 Mortar Mission Equipment Package

***TDP not 100% complete***

Distribution Statement A: Approved for public release; distribution is unlimited



# MEP Definitions (Draft – Pre-AoA)



- **General Purpose Vehicle will:**

- Have a crew of 2 with up to 6 passengers
- Integrate WIN-T

- **Command Vehicle will:**

- Host common C4 Mission Equipment Packages (MEP) and Government Furnished Equipment (GFE) including shelter.
- Provide for a minimum of two (2) workstations with an operator per workstation
- Integrate SINCGARS, BFT2, WIN-T, JTRS GMR, JTRS HMS, MFCS, AFATDS, other ABCS systems, etc





# MEP Definitions (Draft – Pre-AoA)



- **Mortar Carrier Vehicle will:**

- Accommodate a smoothbore 120mm Mortar system, which must be capable of firing: HE, illumination, IR illumination, smoke, precision munitions, and the Family of Extended Range Munitions (FERA).
- Integrate the current M95 Mortar Fire Control System-mounted and carry current ground mounting and firing equipment as utilized on the M1064 Mortar Carrier
- Accommodate four Soldiers



# MEP Definitions (Draft – Pre-AoA)



- **Medical Treatment and Medical Evacuation Vehicles will integrate:**
  - Litter lift system
  - Ambulatory seating
  - Mounting brackets for the Mission Equipment Package (MEP)
  - ECU and heating
  - Medical grade power for the MEP sets
  - Storage for medical items
  - Locked cabinets for controlled substances
  - IV holders
  - Lighting



# Closing Remarks



- **Out years are lean - Cost & Schedule will be critical**
- **ECP efforts are not STS**
- **Ensure you know the vehicle requirements and specifications**







**MARINE CORPS SYSTEMS COMMAND**

***EQUIPPING THE WARFIGHTER TO WIN***

***PM Tank Systems***

# PM Tank Systems

## PMM 142



**LtCol J.E.Smith**  
**25 Oct 2011**



# MARINE CORPS SYSTEMS COMMAND

***EQUIPPING THE WARFIGHTER TO WIN***

## ***PM Tank Systems' Mission***

**To equip operating forces with effective sustainable tank, heavy recovery, assault bridging and support systems to accomplish their warfighting missions; and to incorporate next-generation technologies to ensure their continued combat dominance.**





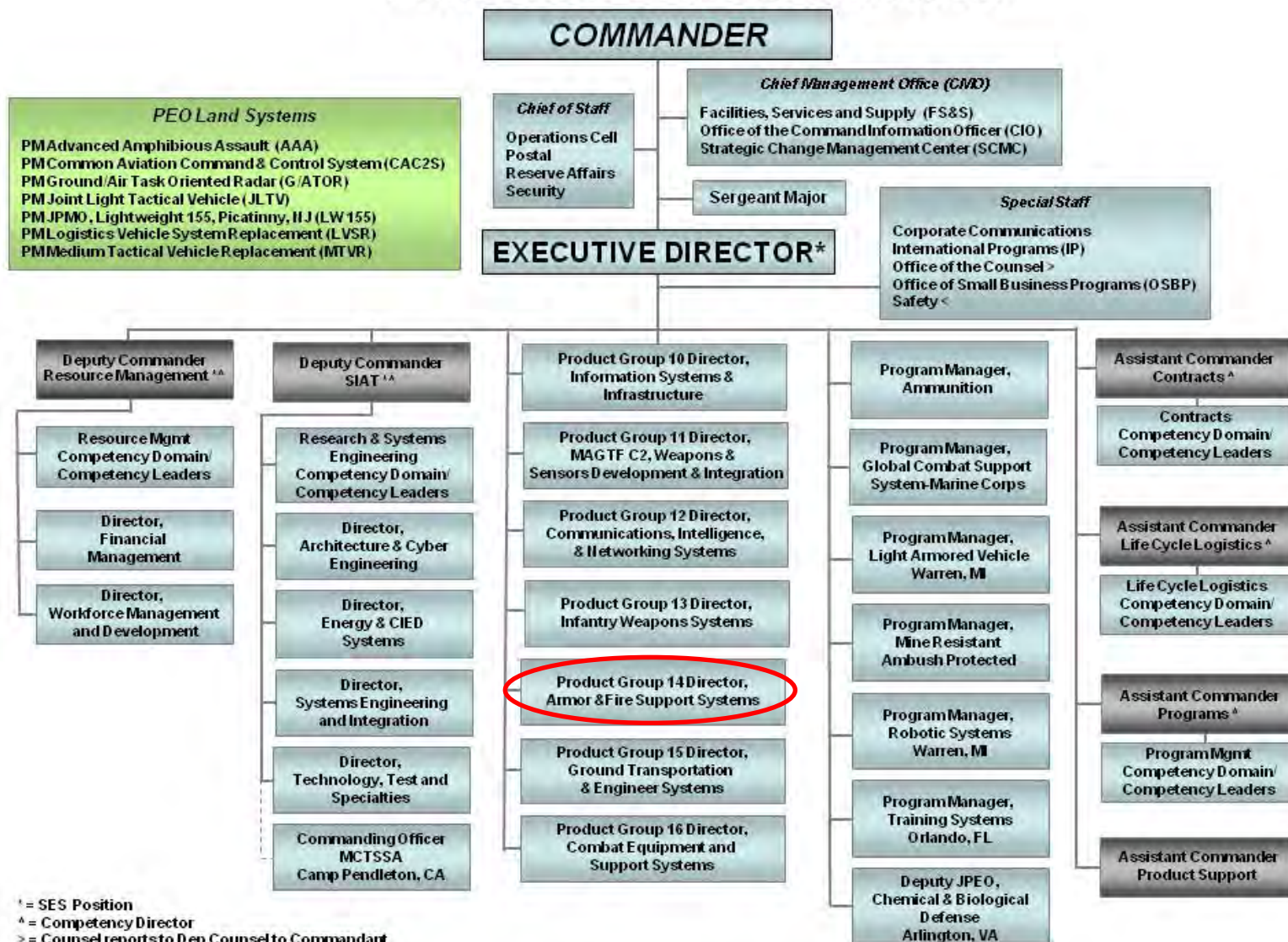


# MARINE CORPS SYSTEMS COMMAND

EQUIPPING THE WARFIGHTER TO WIN

## Systems Command

### MARCORSYSCOM ORGANIZATION



<sup>1A</sup> = SES Position

<sup>A</sup> = Competency Director

> = Counsel reports to Dep Counsel to Commandant

< = Safety reports to SIAT



# MARINE CORPS SYSTEMS COMMAND

**EQUIPPING THE WARFIGHTER TO WIN**

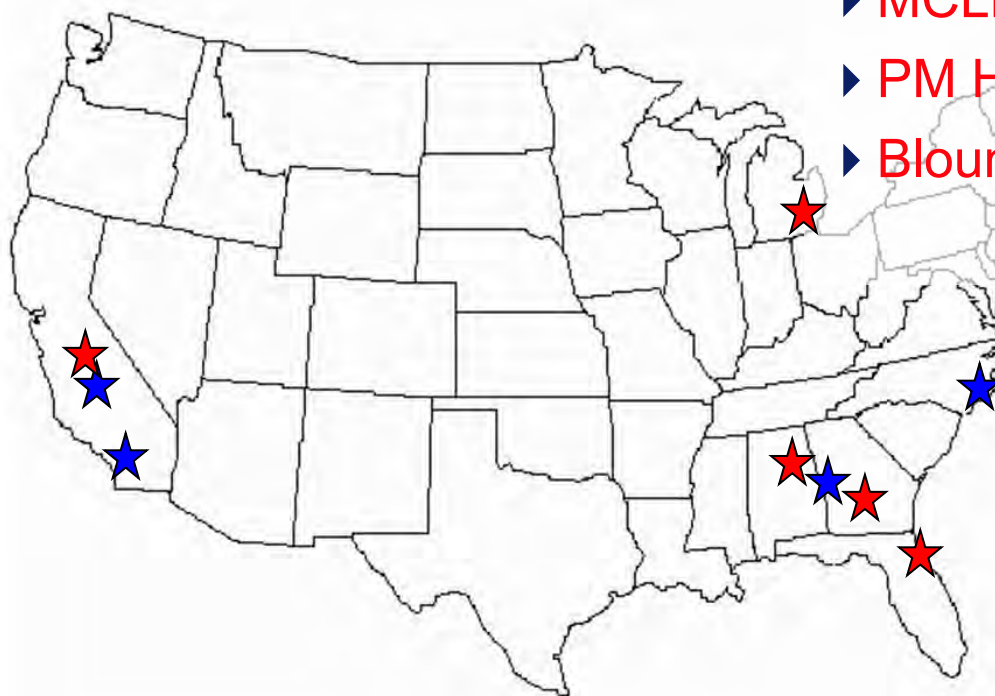
## Customers

### Customers

- ▶ 1<sup>st</sup> Tank Bn
- ▶ 2<sup>nd</sup> Tank Bn
- ▶ 4<sup>th</sup> Tank Bn
- ▶ Fort Benning

### Principle Government Partners

- ▶ Anniston Army Depot
- ▶ MCLB Albany, Ga
- ▶ MCLB Barstow, Ca
- ▶ PM HBCT, TACOM
- ▶ Blount Island Command





# MARINE CORPS SYSTEMS COMMAND

*EQUIPPING THE WARFIGHTER TO WIN*

## Projects

- ▶ Tank:
  - Abrams Suspension Upgrade
  - Stabilized Commander's Weapon Station
  - Improved Loader's Weapon Station
- ▶ M88A2
  - Commander's Weapon Station
  - Automatic Fire Extinguishing System
  - Electronic Fuel Injection
  - Cold Start
- ▶ AVLB
  - Hydraulic/Electric Upgrade





# MARINE CORPS SYSTEMS COMMAND

*EQUIPPING THE WARFIGHTER TO WIN*

...Future

## ▶ User's priorities\*

- C2 improvements
- Improved Commander's Sensor Suite
- Driver's station improvements

## ▶ Where we can use help

- How can we be lighter?
- How can we reduce expeditionary support requirements?
- What opportunities are there to reduce operating costs?

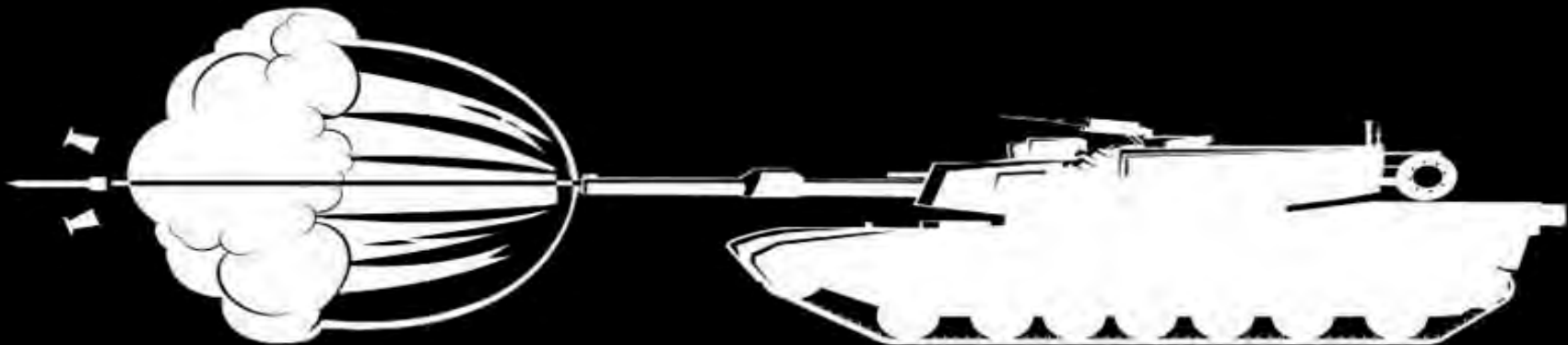
\* (currently undefined as a requirement)



**MARINE CORPS SYSTEMS COMMAND**

***EQUIPPING THE WARFIGHTER TO WIN***

# *Questions*



***PM TANKS***